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BLOOD'S PATENT CAR SEATS.

When we consider the number of improvements that have in late years been made for the purpose of adding to the comfort of railroad passengers, or rather, perhaps, of dispensing with some of their many attendant discomforts, it is somewhat marvelous that the seating arrangements have received so comparatively little attention. The chief difference, in this respect, between a "palace drawing-room" and an emigrant car seems to be in the character of the upholstering; it apparently being held that the only proper and legitimate position for the vertebrate column is pointed toward heaven. An erect sitting posture is quite comfortable at first, but the continual jar tends to render it monotonous and almost impossible to maintain, and here the traveler finds himself reduced to a choice from a few attitudes which vary considerably in their elegance but very little in their comfort. He slides slowly down until it is necessary to brace his knees high up against the back of the forward seat and here, in the shape of a horizontal interrogation mark, he finds a "brief bitter bliss" until his breaking neck and aching limbs compel him to resign it.

Variations of Blood's Improved Car Seats.

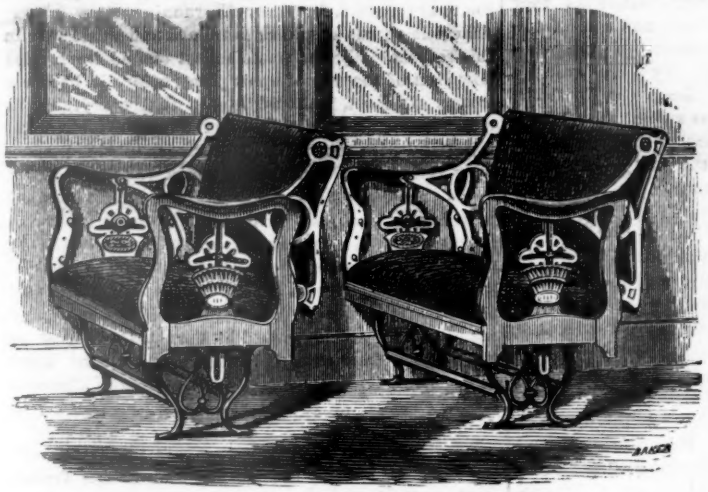
The most ingenious traveler is seldom able to suggest to himself any improvement on these two luxurious positions, unless he be fortunate enough to secure, and keep, a double seat, in which exceptional case he can prop himself up with his baggage and devise a variation of his agony.

A New York daily some time since published an article inveighing rather intemperately against the sleeping car system. In the course of its remarks one really valuable suggestion was made which is pertinent to our subject: "Could some one construct a shifting or "adjustable chair, so arranged as to be "made as comfortable as a couch, it "would be a benefaction to travelers "and a fortune to the inventor. Reclining chairs we have, indeed, in abundance; but they usually compel the occupant to lie or recline on his back. "An easily-adjustable chair, which would "allow him to lie on either side, and to "change position as in an ordinary bed, would greatly "lessen the discomforts of travel by rail at night."

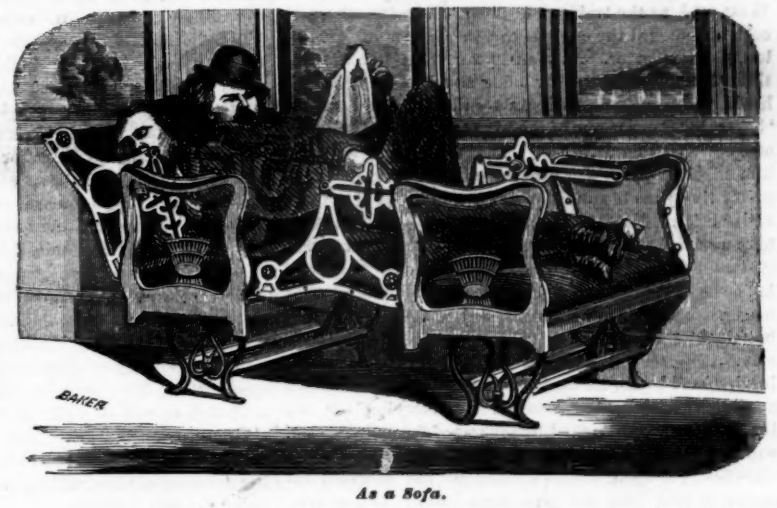
Such a "shifting or adjustable chair" has, we think, been secured, and we present some of the transformations which Mr. Blood's invention is capable of, not as an untried proposition, but an improvement which has been submitted to skillful car-builders and experienced railroad men and has received their substantial endorsment in a way that will be gratifying to the traveling public as well as to the inventor. On the St. Louis & Iron Mountain road, where it is desirable to compete with the elegance and comfort of the Mississippi river steamers, the President, Mr. Thomas Allen, tested and approved of the invention, and, with his customary energy and sagacity, at once ordered its adoption. Two passenger cars, fitted with the improved seats, are now building to run as "special day cars."

One strong objection to which most improvements of this character are liable does not obtain in this case. The expense is comparatively trifling, inasmuch as the adoption simply compels a change of the irons on which the backs of the seats revolve, and this is effected at a cost of about three dollars a seat.

One of our illustrations represents the seats standing unoccupied, in an attitude similar to that of ordinary car seats, promising unalloyed wretchedness to the uninformed traveler. Another shows a change that may be instantaneously made, securing an additional slant to the back and support for the head and allowing an easy, half-reclining position which will be found very soothing. This inclination of the back can be secured at any angle, which suggests the other transformations represented. The back can be entirely revolved so as to cover the intervening space between the seats, furnishing a comfortable, roomy lounge whereon at least two persons can find great comfort. One of the greatest advantages to be derived from this adjustability is shown by the first engraving. It is as great a grievance for a child to sit erect for one hour as for a strong man to keep in that position ten times as long. While a man can relieve his restlessness by wandering into the smoking car and stepping out on the platform at stations, ladies feel obliged to remain in their seats, and for this reason, as well as many others, additions to their comfort are demanded. In the manner shown a small family can be disposed of in a very compact way, and their comfort, particularly that of the little ones, can be secured during a long journey.



Blood's Improved Car Seats.



As a Sofa.

Half Reclining Position.

These changes are all made without trouble by graduating the movement of the shifting irons to the desired position, and when the wished-for arrangement is made, a lock attached to the shifters secures them firmly in their place until another change is desirable. The devices

are so simple that they may be worked by the comfort-seeker without instruction, even though he have not a "mechanical turn of mind."

Commending these improvements is not predicting that they will supersede, or even materially encroach on the province of, sleeping coaches. Added comfort in day cars will be rather provocative of a desire for the other comforts of sleeping cars, among which are privacy, toilet facilities, attendance and purer air than is found in most day cars.

But the improved seat will be found useful in very many cases by night as well as by day. Invalids, for instance, can travel in comparative comfort by day, on trains that have no sleeping-cars. Hundreds and thousands of travelers who spend but part of a night on a train do not think it worth their while to engage a berth, or even to undress, yet could get much welcome rest on one of these seats. Thus they will be especially valuable to local travelers. Moreover, the class is not small—is, indeed, very large, though not often sufficiently considered—of travelers who feel unable to pay for the luxurious accommodations of palace sleeping cars. To say that these should have no provisions for their comfort, is as unreasonable as to say that there should be no second-class hotels. In every town we see provisions made for people who cannot pay a dollar for lodging in a first-class hotel; why should we not also provide for this class on trains?

The use and popularity of these seats on the Hannibal & St. Joseph Railroad we have noted heretofore. A late Kansas paper informs us that it has been introduced into the day cars of the Kansas Pacific. Wherever it has been used, so far as we can learn, it has been very popular with travelers.

Several other railroad companies are negotiating for the use of this invention. Mr. John H. Blood, St. Louis. Mo., a brother of the patentee and part owner of the patent, is authorized to dispose of rights and make contracts with any roads in the United States.

—The Des Moines *Register* of the 16th says:

"At Newton, on Saturday, a hive full of bees was received at the express office to be sent to some point West, and, as the train came along, was, with other parcels, put aboard the express car, in charge of Mr. Millen, the messenger. As soon as the train left the station, the motion of the car being novel to the bees, this having been their first trip on a railroad, a few of the 'bosses' were sent out of the hive to inquire of the messenger 'why this was thus,' and, as he says, annoyed him exceedingly by their pertinacity, 'going for him' pretty lively, as his answers did not seem to give them satisfaction. Now, if an express company contracts to take a parcel to a given point, it is, no doubt, right that it should do it at all hazards. But although 'beesness' is 'beesness,' the messenger was of the opinion that bees-nests were also bees-nests, and, if the bees were to be taken as passengers in his car, they should themselves conform to the usual rules, which they not seeming inclined to do, he decided to put them off the train as soon as it arrived at Altoona. In carrying out his intention he was attacked by several of the malcontents, and had to drop the hive on the platform at the station. This broke it open, and in a moment the released inmates rushed into the passenger-coaches in a swarm, and employed the shining moments in making it red-hot for the passengers. Handkerchiefs, shawls, hats, coat-tails, &c., flapped in all directions, and it is even vaguely hinted that there was some tall swearing done just about that time."

—A telegram from Washington, dated the 28th ult., says: "The Government having paid considerable amounts in interest on bonds of the various Pacific railroads, which it had guaranteed, which sums have not yet been paid into the treasury, Secretary Boutwell has notified the chief of the warrant department not to pass any more warrants for payment of Government freights or transportation of the Kansas Pacific, Union Pacific or Central Pacific railroads until these reimburse the Government for amounts already advanced. In consequence of this action there is considerable excitement among the agents of the above corporations, who have been here for some time endeavoring to get their accounts settled. The Union Pacific owes $2,283,-229; the Kansas Pacific, $488,169; the Central Pacific, $3,020,129. The balance due from other Pacific roads is comparatively small."

—During a late thunder storm, one of the nitro-glycerine charges in the heading of the central shaft at Hoosac Tunnel was exploded; it is supposed by electricity communicated by the atmosphere, the heading wire being uncovered and exposed at the top of the shaft.

Contributions.

PREPARATION FOR WINTER.

BY WM. S. HUNTINGTON.

Although some of our railroad men have taken advantage of the pleasant fall weather to put things in order for winter, there are others who have made scarcely an effort to get things "snug," before King Frost gets things in his icy grip. The expense of operating a railroad through the winter can be greatly reduced by making timely preparation, and as important matters in this line are frequently overlooked or neglected until too late, a few hints on the subject may not be amiss, even at the "eleventh hour."

Reference is here made more particularly to such work as cannot very well be done after the ground is deeply frozen, but there are other matters deserving of attention, which, although they are of such a nature that the work may be done at anytime so far as weather is concerned, yet are often postponed until they are the occasion of great inconvenience and needless expense.

The building and repairing of engine houses, station buildings, shops, etc., are often neglected until cold, stormy weather has set in, when the workmen cannot accomplish half so much as in mild weather. Much work must be done out of doors which cannot be well done except under cover. Sheds or temporary buildings are often erected for summer use for shops with the expectation that more comfortable quarters will be ready by the time they are needed; but we often see men shivering around these shanties, "putting in their time" as best they can, until midwinter or later. Running a paint shop or a carpenter shop in a shanty or in the open air in cold weather is unprofitable and in most cases it is the result of negligence rather than a necessity. The great number of fires that originate in these temporary buildings would seem to be a sufficient reason for discontinuing their use as early in the season as possible. It is well known that workmen will not exercise as much care and watchfulness in regard to fires in and around these temporary shops as they are likely to do in substantial and comfortable buildings. Newspaper accounts of the destruction of railroad buildings by fire usually wind up with the statement that "the fire originated in "a temporary building occupied as a paint shop," or a carpenter shop, as the case may be; or the fire was first discovered in the oil room, or in the waste room. The oil room is the place above all others that should be fitted up with special care to guard against danger from fire. And when everything is done that a special regard for safety demands, this room should be put in charge of none but strictly trustworthy persons. A little carelessness about the oil room has cost many a railroad company tens, and, in some cases, hundreds of thousands of dollars. Another matter in this connection is deserving of attention, and that is spontaneous combustion. More than one railroad company has been well-nigh ruined by a pile of dirty waste or old rags taking fire "on their own hook." Piles of waste and rags should not be allowed to accumulate inside a building, or even outside, unless in a place especially provided for that purpose.

Putting up stoves is a matter that should be carefully attended to. In permanent buildings there is less danger of fire from stoves than in a "shanty," for the reason that proper precautions are usually taken to guard against it, but it is well to see that no defective pipe is used and that it cannot come apart. In putting up a stove for temporary use in rough buildings, it is not uncommon to use any old worn-out affair, and if there are several good-sized cracks in it, it is considered good enough for "this place." This, together with any old pipe that can be picked up, is considered good enough for a shanty; and as it is only to be used for a short time, it cannot be dangerous, for, as the Irishman said to the insurance agent who was soliciting his patronage, "Who ever knew a house to burn down in three weeks?" The bitter experience of others, however, has proved that three weeks is ample time for the destruction of a large amount of property. As a little caution is not expensive, the above hints may be acted upon to good advantage, although to some they may appear of too trifling a character to be worthy of notice.

If you have an engine house that needs banking up, or any repairs, it will pay to attend to them at once. A cold engine house is improfitable and dangerous. It is important that a locomotive be thoroughly wiped—wiped clean—, and this cannot be done when the oil and grease becomes hard and stiff with cold. When an engine house is left unrepaired until cold weather, it is common to see oil barrels placed near the stove so that cans may be more readily filled, and as it is necessary to keep an exceedingly hot fire, this is often the cause of mischief. Perhaps it would not be an extravagant statement to say that more railroad property is destroyed by fire which originated in buildings out of repair and in the temporary buildings above mentioned than in any other way. Men that are obliged to shiver over their work day after day and night after night become reckless and "would as soon the old rookery would burn down as not."

December is the month for fires, at least it is said that more disastrous fires occur in this month than in any other, and who shall say that a majority of them are not caused by neglecting to make timely preparation for winter?

Engineers and others are often greatly annoyed by the pits of turntables becoming filled with snow. It is not an expensive operation to cover a turntable so as to prevent trouble from snow, which is not only troublesome but expensive to get rid of. It seems a useless waste of time and labor—which means money—to shovel the snow from a turntable track several times a day, and frequently on dismal stormy nights to be occupied an hour or two in turning a locomotive, and it is decidedly unpleasant.

There are many things in the track department that need attention at this season of the year and which are frequently neglected, and although some of these matters have received attention in previous numbers of the Railroad Gazette, it may not be out of place to mention briefly the most important matters in this line that are most commonly overlooked.

Section men, in their anxiety to get track in as good surface as possible before this operation is stopped by frost, frequently allow the ditches, especially in narrow cuts, to become filled with waste ballast, old ties, etc. These frequently cause water to overflow the track, which, becoming frozen, is the cause of much serious mischief. All ditches and water courses should be thoroughly cleared of all obstructions before the coming of winter.

Fences at cattle guards are frequently of a temporary character, made up of old ties, fence rails, etc., and are too near the track for safety in running snow plows. All cattle guards should be examined and made safe in this respect. Piles of waste ballast should be leveled down out of the way of snow plows before it becomes frozen. In short, it should be seen that everything is clear; for when everything of a dangerous character is covered with snow, it is dismal work to run a snow plow at the speed that is frequently required. Don't forget to secure all crossing planks, for a pilot or snow plow is very handy at picking them up and shoving them through the smoke-stack or the car windows. In putting down crossing plank the ballast should be removed from between the ties to the depth of a couple of inches below the surface of the ties, in order to keep the planks from being raised by the action of frost on the ballast. Care should also be taken that no water can settle under the planks and remain there. Champer off the ends of the planks and spike them down in good shape.

Now is the time to put track in perfect line; take out the slightest "kink," so that when the ballast freezes solid the line will be good during the winter. By a proper attention to this matter an immense amount of wear to rails and general wear of rolling stock will be prevented. This matter is of great importance and should by no means be neglected. Defective rails or those that are much battered and slivered, should now be removed and replaced by sound ones. When rails are full of frost the slightest defect renders them dangerous. Bridge men can be profitably employed in making proper provision for contraction of bolts, rods, stays, etc. Lack of attention to this matter is not infrequently attended with serious results. Roofs of buildings supported by iron frames need attention at this season of the year. The writer barely escaped with his life at the falling of the roof of the Union Depot in Troy, N. Y., in the winter of '63, which was occasioned by the contraction of rods and stays, in a sudden "cold snap." These sudden "cold snaps" and sudden falls of deep snow very frequently find things unprepared for their coming. Water tanks and pumps connected tharewith are sometimes in a bad condition for the coming of cold weather.

There are other matters that should be attended to at this season of the year, but enough has already been said to put this matter of "preparation for winter" into the minds of all concerned in railroad matters, and a word to the wise is sufficient.

—It is reported that by Mr. Little's improved automatic telegraph, by which at first only 200 words per minute could be transmitted, has been so improved that now 2,000 words per minute can be transmitted by it.

Baron Von Weber's Experiments on the Stability of Permanent Way.

(CONTINUED FROM PAGE 197.)

We now come to the experiments made by Baron von Weber to obtain an answer to question *d*, (*vide* page 196 of our last number). It was of course requisite, in order that a proper comparison might be instituted, that these experiments should be conducted under circumstances as nearly as possible identical with those which existed when the resistance to displacement of the unloaded structure was investigated; and in selecting portions of permanent way for the last-mentioned experiments, therefore, such lengths were chosen as would afford space for the experiments with the loaded structure without introducing any variations in bedding, firmness, of the ballast, &c. In the tables containing the results of the experiments made to ascertain the resistance to lateral displacement of the permanent way when loaded, we shall for convenience of comparison repeat the results obtained with the unloaded structures.

8th Series of Experiments. In this series the sleepers were bedded in the ballast with the latter level with their upper surfaces, as in the fourth series. The press also acted upon the central sleeper as in the series of trials just mentioned, and the construction of the permanent way was the same. To ascertain the effect of a load, however, a tank locomotive weighing 27 tons was placed on the rails so that the driving axle, carrying a load of 10 tons, was situated directly over the central sleeper to the end of which the press was applied. The results of the experiments are given in the annexed table:

Pressure applied.	Displacements of unloaded structure.				Displacements of loaded structure.			
	Experiment I.	Experiment II.	Experiment III.	Experiment IV.	Experiment I.	Experiment II.	Experiment III.	Experiment IV.
centners. lb.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.
10 = 1,194	.....	1.5 = 0.059	.....	1.5 = 0.059	.....	.....	.....	.....
20 = 2,389	.....	3.0 = 0.118	.....	3.0 = 0.118	.....	.....	.....	.....
25 = 2,986	.....	6.0 = 0.236	.....	6.0 = 0.236	.....	.....	.....	.....
30 = 3,403	.....	9.0 = 0.354	.....	9.0 = 0.354	.....	.....	.....	.....
35 = 3,970	.....	18.0 = 0.709	.....	18.0 = 0.709	.....	.....	.....	.....
40 = 4,557	.....	24.0 = 0.954	.....	21.0 = 0.827	.....	.....	.....	.....
45 = 5,105	.....	30.0 = 1.181	.....	30.0 = 1.535	.....	.....	.....	.....
50 = 5,672	.....	39.0 = 1.535	.....	42.0 = 1.653	.....	.....	.....	.....
55 = 6,239	.....	48.0 = 1.889	.....	48.0 = 1.889	.....	.....	.....	.....
60 = 6,806	.....	60.0 = 2.362	.....	60.0 = 2.362	.....	.....	.....	.....
65 = 7,373	.....	.....	.....	.....	.....	.....	.....	.....
70 = 7,940	.....	.....	.....	.....	.....	.....	.....	.....
85 = 9,675	.....	.....	.....	.....	.....	.....	.....	.....
90 = 10,242	.....	.....	.....	.....	.....	.....	.....	.....
100 = 11,944	.....	.....	.....	.....	.....	.....	.....	.....
130 = 14,747	.....	.....	.....	.....	.....	.....	.....	.....
140 = 15,881	.....	.....	.....	.....	.....	.....	.....	.....

Pressure applied.	Displacements of unloaded structure.			Displacements of loaded structure.		
	Experiment I.	Experiment II.	Experiment III.	Experiment I.	Experiment II.	Experiment III.
centners. lb.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.
10 = 1,194	0.8 = 0.031	1.5 = 0.059	0.8 = 0.031	.....	.....	.....
20 = 2,389	1.5 = 0.059	3.0 = 0.118	1.5 = 0.059	.....	.....	.....
30 = 3,403	3.8 = 0.149	4.5 = 0.177	3.0 = 0.118	.....	.....	.....
40 = 4,557	4.5 = 0.177	6.0 = 0.236	6.0 = 0.236	.....	.....	.....
50 = 5,672	5.3 = 0.208	12.0 = 0.472	9.0 = 0.354	.....	.....	.....
60 = 6,806	18.0 = 0.708	18.0 = 0.708	18.0 = 0.708	.....	.....	.....
65 = 7,373	60.0 = 2.36	48.0 = 1.899	30.0 = 1.181	.....	.....	.....
70 = 7,940	.....	60.0 = 2.36	60.0 = 2.36	.....	.....	.....
80 = 9,075	.....	.....	.....	.....	.....	.....
90 = 10,310	.....	.....	.....	.....	.....	.....
100 = 11,944	.....	.....	.....	.....	.....	.....
110 = 12,478	.....	.....	.....	.....	.....	.....

It will be seen from this table, which gives the result of seven sets of trials, that the resistance of the structure to lateral displacement was increased almost tenfold by the load of 27 tons; and that lateral pressures which produced in the unloaded structure, displacements entirely inadmissible in practice did not affect the loaded structure in any perceptible degree. The portion of the unloaded structure shifted by the press in the above experiments weighed almost exactly 2½ tons, while the total mass moved, including the filling against the ends of the sleepers, weighed 3 tons: and taking this into consideration, it appeared as if the resistance to displacement varied directly—as indeed it might have been supposed it would do—as the weight resting on the ground.

9th Series of Experiments.—To determine the point just mentioned, three portions of a very firmly and regularly bedded length of permanent way were selected and were submitted to trial in the same manner as was adopted in the last series of experiments, each portion being first tested unloaded, next, tested while carrying a loaded truck weighing 14 tons 15 cwt.; and, third, being tested while carrying the 27-ton tank engine already mentioned. After each trial, the permanent way was shifted back into its original position, and made completely ready for traffic; and it was allowed to remain untouched several days between each trial and the succeeding one. The results of these experiments are recorded in the following table; and considering the unavoidable irregularities consequent upon variations of the ballast, &c., they may, on the whole, be taken as supporting the theory above advanced.

Pressure applied.	Displacement of unloaded structure.			Displacement of structure loaded with heavy truck weighing 14 tons 15 cwt.			Displacement of structure loaded with tank locomotive weighing 27 tons.		
	Experiment I.	Experiment II.	Experiment III.	Experiment I.	Experiment II.	Experiment III.	Experiment I.	Experiment II.	Experiment III.
centners. lb.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.
10 = 1194	0.8 = 0.031	.....	.....	Imperceptible.					
20 = 2389	2.3 = 0.091	.....	.....						
25 = 2986	.....	1.5 = 0.059	1.5 = 0.059						
30 = 3403	3.5 = 0.098	.....	.....						
35 = 3970	.....	.....	1.5 = 0.059	0.4 = 0.016	0.8 = 0.031	..	0.8 = 0.031	..	0.8 = 0.031
40 = 4557	3.0 = 0.118	.....	.....	0.8 = 0.031	0.8 = 0.031	..			
50 = 5673	6.0 = 0.236	.....	2.0 = 0.118						
60 = 6806	.....	2.3 = 0.91	4.5 = 0.177						
65 = 7373	6.0 = 0.236	3.0 = 0.118							
70 = 7940	24.0 = 0.945	6.0 = 0.236							
80 = 9075	12.0 = 0.472	4.5 = 0.177							
90 = 10210	54.0 = 2.126	24.0 = 0.945	48.0 = 1.889	1.9 = 0.047	1.2 = 0.047	1.5 = 0.059	0.8 = 0.031	1.9 = 0.47	0.8 = 0.031
100 = 11344	.....	60.0 = 2.36	60.0 = 2.36		1.5 = 0.059	2.3 = 0.091			
130 = 14747	.....	.....	.....		2.3 = 0.091	3.0 = 0.148	1.5 = 0.059	1.5 = 0.059	1.3 = 0.051
135 = 15314	.....	.....	.....		3.3 = 0.130	.....			

10th *Series of Experiments.* The conditions observed in this set of experiments were the same as in the seventh series of trials. An unloaded length of permanent way was first tested, and subsequently a length loaded with a goods wagon weighing, with its load, 10½ tons. The results of these experiments, which are recorded in the table below, also show approximately a direct relation between the load to be moved and the force required for effecting the displacement. Baron von Weber's conclusion with regard to this subject is that the force required to produce the lateral displacement of a permanent way structure is directly proportionate to the weight by which the structure is pressed upon the ground.

Pressure applied.	Displacements of unloaded structure.			Displacements of structure loaded with a goods wagon weighing 10½ tons.		
	Experiment I.	Experiment II.	Experiment III.	Experiment I.	Experiment II.	Experiment III.
centners. lb.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.	mil. in.
10 = 1,194	0.8 = 0.031	1.5 = 0.059	0.8 = 0.031	.....	0.8 = 0.031	0.8 = 0.031
20 = 2,389	1.5 = 0.059	3.0 = 0.118	1.5 = 0.059	.....	1.5 = 0.059	1.5 = 0.059
30 = 3,403	3.0 = 0.118	4.5 = 0.177	3.0 = 0.118	.....	4.5 = 0.177	4.5 = 0.177
40 = 4,557	4.5 = 0.177	6.0 = 0.236	6.0 = 0.236	.....	.....	.....
50 = 5,672	6.0 = 0.236	9.0 = 0.354	9.0 = 0.354	.....	.....	.....
60 = 6,806	18.0 = 0.708	18.0 = 0.708	18.0 = 0.708	.....	.....	.....
65 = 7,373	60.0 = 2.36	48.0 = 1.899	30.0 = 1.181	.....	.....	.....
70 = 7,940	.....	60.0 = 2.36	60.0 = 2.36	.....	.....	.....
80 = 9,075	.....	.....	.....	.....	.....	.....
90 = 10,310	.....	.....	.....	.....	.....	.....
100 = 11,944	.....	.....	.....	.....	.....	.....
110 = 12,478	.....	.....	.....	.....	.....	.....

Experiments relating to question (e). In considering the influence of piles or stakes driven into the ballast against the ends of the sleepers to prevent lateral shifting of the latter, Baron von Weber remarks that the resisting power of such piles has been very differently "estimated" by railway engineers; but that as far as he is aware the advantages or disadvantages attending the use of such piles has never been ascertained by experiment. Many elements evidently exercise an influence on the lateral displacement of piles driven vertically into the ground, and experiments made with a view of ascertaining the lateral resistance of such piles can only show in a very general manner how far the advantages derived from their use will counter-balance the extra expense they involve. The results obtained by experiment are moreover liable to great variations. Thus, a pile driven deeply into solid loamy soil offers in dry weather great resistance to lateral displacement, whereas, after a shower of rain—not strong enough to soak into the ground but capable of penetrating the narrow crack formed between the pile and surrounding earth by the vibrations caused by the traffic—the upper end of the pile can be moved, by the application of a comparatively small force, to an extent sufficient to render it useless as a means of lateral support for the sleeper. Thus Baron von Weber has found that piles which, in dry weather, required a force of from 15 to 20 cwt. to shift their heads laterally through a distance of 1 in., could be moved to the same extent by a force of about 5 cwt., after a shower of rain lasting barely one hour.

The elements by which the lateral stability of such piles as those we are now considering is effected are: the diameter, length, and section of the pile, the description of wood of which it is made, and the nature of the ground into which it is driven. To determine the influence of all these elements in their various combinations, a very extensive series of experiments would have been required, and Baron von Weber therefore confined his researches to ascertainining the maximum resistance of such stakes as are used on the Saxon State Railways, availing himself, however, of all available opportunities of noticing the resistance under unfavorable circumstances.

The principle was laid down that a displacement of the top of a pile to the extent of 10 millimetres (=0.39 in.) should be considered as inconsistent with its further usefuluess; and the experiments were conducted in the following manner: Wooden piles, some 4 in. in diameter and some 4 in. square, were driven into the ground in the neighborhood of some fixed object, such as a wall or rock, and—leaving the ground in the neighborhoood of some fixed object, such as a wall or rock, and—leaving the ground beyond the pile untouched—an excavation was made between each pile and the fixed object so that the hydraulic press could be placed between the former and the latter, and made to act against the head of the pile in the same manner as the end of a sleeper would do when shifted literally by the pressure of the trains. The experiments, it should be especially noticed, were all made in dry, hot weather.

11th Series of Experiments. In this series of trials the press acted against a number of oak stakes, some of round and some of square section, and varying from 1 ft. 11⅛ in. to 3 ft. 11¼ in. long. The ground was solid sand or mixed gravel, and some of the stakes had been in use for a considerable time, while others were driven expressly for the experiments. The results showed that a pressure of from 3 cwt. to 5 cwt. was quite sufficient to produce the lateral displacement of 10 millimetres (=0.39 in.), whilst a pressure of 7 cwt. almost forced the stakes out of the ground. These experiments showed, therefore, that in ground of this kind piles driven against the ends of the sleepers could not exercise the least influence upon the stability of the permanent way structure.

12th Series of Experiments. In these trials the press acted against a pile 4 in. in diameter, and 2 ft. 11½ in. long, driven into a heavy, loamy ballast which had been laid down about ten years over the broken stone bedding of an old line. The results which we subjoin, show that the resisting power of such a pile would be of but little use for increasing the lateral stability of the structure.

Pressure applied. cwt.	Displacement of pile. millimetres. in.
4	5.0—0.197
6	10.0—0.394
7	15.0—0 591
8	20.0—0.787
8½	30.0—1.181

13th Series of Experiments. There trials were made on a pile 4 in. square and 4 ft. 11 in. long, driven into the same ground as the pile tested in the last series of experiments. The results were as follows:

Pressure applied. cwt.	Displacement of pile. millimetres. in.
4	2.0 = 0.078
6	4.0 = 0.157
7	9.0 = 0.354
8	12.0 = 0.472
10	2 .0 = 0.787
15	35.0 = 1.378
20	60.0 = 2.362
22	80.0 = 3.15

These results showed that the length and section of the pile exercise an important influence on its resistance to lateral pressure. It was found in these last two series of experiments that when the displacement of the piles became great, the ground behind them cracked radially and rose considerably; while when the cracks reached certain dimensions it was found that no increase of pressure was required to produce a further displacement of the piles.

14th Series of Experiments.—In these experiments the press acted against a pile 2 ft. 7½ in. in length, and 4 in. in diameter recently driven into solid loamy ballast which had been in place several years. The results are subjoined:

Pressure applied. cwt.	Displacement of pile. millimetres. in.
6½	5.0 = 0.197
8	7.0 = 0.276
10	20.0 = 0.787
15	25.0 = 0.984

Soon after the commencement of this set of experiments, and at a pressure of about 8½ cwt., two large cracks were formed radiating from the pile and enclosing between them an angle of about 100°. The ground between these cracks rose in two or three lumps, and the resisting power of the pile ceased almost entirely; but on the pressure being removed the pile returned to within 12 millimetres of its original position, and the ground resumed its former place. A shower of rain

would have entirely removed all traces, on the surface, of the displacement of the piles, but it would not, of course, have given to the latter its original stability.

15*th Series of Experiments.* These trials were made on a pile 4 in. square and 2 ft. 11½ in. long, which had been driven for years in exceedingly hard loamy ground, on an unused line of rails. The results were as follows:

Pressure applied. cwt.	Displacement of pile. millimetres.	in.
5	1.0	= 0.039
6½	4.0	= 0.157
10	20.0	= 0.787
15	30.0	= 1.181

In this case, the same effect as in the last set of experiments was observed, the ground between the cracks, however, being broken into a less number of pieces; on the pressure being removed, a permanent displacement of 12 millimetres remained, and the pieces of ground arranged themselves in their former places.

16*th Series of Experiments.* The pile tested in this case was 4 in. in diameter and 4 ft. 11 in. long, and was driven into hard loamy ground as in the preceding experiments. The following are the results obtained:

Pressure applied. cwt	Displacement. of pile. millimetres	in.
5	1.0	= 0.039
10	3.0	= 0.118
15	8 0	= 0.315
20	22 0	= 0 866
30	45.0	= 1.772
35	80 0	= 3.130
40	122 0	= 4 803

The same occurrence took place as in the fourteenth and fifteenth sets of experiments; but at a pressure of 40 cwt. the pile broke off at a point 16 in. below the surface, so that its permanent displacement could not be ascertained.

Baron von Weber's conclusions drawn from the experiments relating to question (*e*) are as follows: 1st. That the resistance of piles driven into sandy or other light ground is so insignificant that the use of such piles under such circumstances will not produce an increased stability of the structure against lateral displacement; 2nd. That the resistance of piles driven into heavy solid ground is much greater than that of piles driven into sandy ground; but that even in the former place the piles must be driven rather closely if they are to afford any sufficient resistance to small lateral displacements of the permanent-way structure; 3rd. The resisting power of piles, and especially their resistance to small displacements, increasing with their length, and in a more rapid ratio than the latter, it is considered that no piles, to produce an effect commensurate with their cost, should have a length of less than 5 ft.; and 5th. The signs of considerable displacements of piles may, under certain circumstances, disappear after the causes of these displacements have been removed, without, however, the piles regaining their former stability.—*Engineering.*

(*To be continued.*)

Locomotive Performances.

We publish on another page of the present number a long letter from Mr. Walton W. Evans, of New York, on the subject of locomotive performances, and in this letter the writer draws certain comparisons between the work respectively done by American and by Fairlie engines which are very disparaging to the latter. Mr. Evans is a railway engineer of well-known experience, and he is, therefore, well entitled to be heard on the matter of which he writes; but at the same time it would not be fair to Mr. Fairlie, nor, indeed, to English locomotive engineers generally, that his communication should appear in our columns without comment on our part. Mr. Evans is an enthusiastic admirer of the bogie system, whether applied to engines or rolling stock, and he evidently believes sincerely, not merely that American locomotives are better adapted than any other for use on American lines, but also that they are in every way *the* best engines built for any lines whatever. It is evident, in fact, that Mr. Evans is an earnest partisan of the American locomotive, and we fear that he has in several respects allowed his partisanship to interfere with a thorough apprehension of the merits of engines other than those he so greatly admires.

We have no intention, however, of entering here into a discussion with Mr. Evans as to the comparative merits and demerits of English and American locomotives; but we deem it our duty to reply to some of the questions he asks concerning the Fairlie engine, and to direct attention to some very doubtful points in the comparison which he institutes between American locomotives and those of Mr. Fairlie. To Mr. Evans' first question, viz., "How came Mr. Fairlie to give his name to this engine?" we shall leave Mr. Fairlie himself to reply; we presume, however, that Mr. Fairlie called it his engine, simply because it was his, and because he considered he had an undoubted right to it. The second, third and fourth questions we may answer together. The locomotive "Seraing," referred to by Mr. Evans, undoubtedly resembled the Fairlie engine in general outside appearance: but there were several very important differences between it and the engines built by Mr. Fairlie. One of the most important of these differences was specially referred to by Mr. Fairlie in a letter which appeared on page 338 of our last number, and we cannot do better than quote his words here. Referring to a locomotive design, in which the upper framing is arranged in the same manner as in the "Seraing," he says: "The great point of difference between my system and this of Mr. Brunner's, as it also has been with every other attempt in the same direction, is that the carrier frame (in this case supporting the boiler according to my plans) is a long rigid body passing from foot-plate end to smoke-box end, with buffer beams and buffers at each end; it thus receives all strains and shocks, whilst the bogies are mere carriers underneath. The bogies contain the moving power, and when going forward, instead of pulling direct at the load to be hauled, as they do in my case, they simply revolve under a separate frame over the bogie frames to which the load to be hauled is attached. It is like yoking a horse to pull a load, the line of draught, or rather the shafts, lieing on and strapped to the animals back, instead of drawing from the shoulders.....The centre line of traction and buffering is, in my engine, always central between the rails, no matter what curve is being traversed at the time, that is, as nearly as it is possible to be got under any circumstances." Mr. Evans is quite correct in hinting that four-cylinder locomotives have been built by M. Petiet—many such engines are now in use on the Northern and Eastern Railways of France—and it is also true that four-cylinder locomotives have been *designed* by MM. J. J. and A. Meyer, of Mulhouse, but we are not aware that MM. Meyer have ever built any engines on their plans. M. Petiet's and MM. Meyer's engines have been already illustrated in this journal (*vide* pages 331 and 334 of vol. ii., and pages 73 and 76 of vol. iv. respectively), and as a reference to these engravings will show both these designs to be distinctly different from Mr. Fairlie's, it is unnecessary that we should say more of them here.

Mr. Evans's fifth question refers to a matter which was fully discussed in our columns about a year ago; and it was, we think, then satisfactorily proved that the failure of the Queensland engines was by no means due to the Fairlie system, as a system, but purely to defects in the construction and details of those particular engines—defects, by-the-bye, for which Mr. Fairlie was not responsible. No one, in fact, who has seen the performances of Mr. Fairlie's engines at Hatcham can doubt for a moment their capability of running freely round curves farsharper than are to be met with on any railway worked by locomotive power.

The sixth, seventh, eighth, ninth, tenth, twelfth, and thirteenth questions in Mr. Evans's letter can be better answered by Mr. Fairlie than by any one else, and to him we leave them. The eleventh question, however, refers to a matter of general interest. Mr. Fairlie takes the friction of railway vehicles at 10 lbs. per ton, Mr. Evans takes it at 5lbs.; and the question is, which is right? As far as English and Continental rolling stock is concerned we have no hesitation in saying that an allowance of 5 lb. per ton sor friction is far too low; and we very greatly doubt whether it is sufficient for even the American bogie cars. As far as European rolling stock is concerned by far the best series of experiments on resistances which has been carried out is that conducted by MM. Vuillemin, Guebbhard, and Dieudonne on the Eastern Railway of France; and the researches of these engineers showed the average resistance of goods trains at speeds varying from 10 to 20 miles per hour to be 7.95 lb., or practically 8 lb. per ton. Mr. Fairlie takes 10 lb. per ton, and considering that he makes no further allowance for atmospheric resistance nor for the resistance of the numerous curves on the lines on which most of the experiments with his engines have been made, we doubt if this factor is too high. As regards the frictional resistance of American bogie rolling stock on American railways we have little or no precise data to guide us; but taking into consideration the small size of the wheels, and, in many instances, the rough character of the track, we certainly find it difficult to accept a resistance of 5lb. per ton as at all a fair average. Has Mr. Evans ever proved this to be the average resistance by direct experiment, or has he ever known an American car when once set in motion to continue to move without losing speed down an incline of 1 in 443, or say 12 ft. to the mile, simply by the action of gravity? If he has, the question may of course be considered settled, always supposing that the car be tested, and the road on which it ran were in fair average condition.

Mr. Evans' fourteenth question is: "In comparing engine trials, is not foot-pounds of work done in lifting train alone, per hour per ton of weight on the driving wheels, a fair method?" To this question we regret to say we must answer in the negative; and for obvious reasons. In the first place it is evident that any locomotive, English or American, may be worked up to its full power on a perfectly level line, in which case the sum to be divided by the weight on the driving wheels, as proposed by Mr. Evans, would be *nil*. Again, in the case of an engine taking a load up a rising gradient, the adoption of Mr. Evans' proposed standard of measurement would simply be offering a premium for diminishing the load on the driving wheels to the lowest possible amount consistent with obtaining the necessary adhesion, and it would take no account whatever of the boiler power. Let us suppose, for instance, the case of an engine with a single pair of driving wheels, the load on which could be varied from 6 to 10 tons, and let us further suppose the engine to be capable, with the latter adhesion weight, of taking a train of 100 tons up a certain gradient at a speed of 10 miles per hour. Next, let us imagine this engine to be attached to a train of 50 tons, and the weight on the driving wheels reduced to the least load compatible with the haulage of this train up the same gradient at the speed of 20 miles per hour. The speed being doubled, and the weight of the train halved, the number of foot-pounds of work done, as calculated by Mr. Evans' rule, would be the same in the two cases; but the weight on the driving wheels being less in the latter instance, Mr. Evans' divisor would be less, and the same engine would apparently have done a much better duty than before. The fallacy of the standard, as a means of comparison, might also be shown in other ways, were it necessary to do so. Moreover, unless the gradient is so steep that any resistances other than that of gravity become proportionately insignificant, it is not even approximately correct to take the weight of train multiplied by the height lifted per hour, as a measure of the effective work done by the engine.

In making comparisons of the kind referred to by Mr. Evans, we should suggest: First, that the resistances overcome should be exactly ascertained; second, that the work done by the competing engines per hour should be calculated from these resistances; third, that the number of foot-pounds of work done per hour, as calculated is this way, should be divided by the total weight of the engine *and tender* for the purpose of getting a number representing the performance; and, fourth, that the amount of fuel consumed should be carefully ascertained, and that the total number of foot-pounds of work done per hour should be divided by this amount to obtain a number representing approximately the relative economy of the competing engines as power producers. Further, the quantity of water and fuel carried by the engines at starting should be proportionate to the weight of train hauled. We have taken the total weight of engine and tender as the divisor, in place of merely the weight on the driving wheels, because the former really represents the weight of machinery employed and run over the track to achieve a certain result, whereas the latter is, as we have shown, a quantity which may be "dodged" to a considerable extent. In a competitive trial between a Fairlie engine and an ordinary American locomotive, the adoption of such a divisor as Mr. Evans proposes would be especially unfair. One of the principal features of the Fairlie system is, that it renders the whole weight of the locomotive with its fuel and water available for adhesion, thus enabling the engine to haul its load without slipping, even when the state of the rails is such as to reduce the co-efficient of adhesion between the wheels and rails to a very low amount. That this feature is one of considerable value—particularly in engines intended to work on mountain lines at great elevations, and in districts where sleet and mists abound—few locomotive engineers will be disposed to deny; yet, according to Mr. Evans's standard, this advantage would become a direct disadvantage, supposing the competitive trial to be made in good weather, when the adhesion would be in excess.

To Mr. Evans's final question, it is, of course, out of our power to give a reply; but we imagine that however ready Mr. Fairlie may be to match his engine against one of Mr. Evans's, yet that he certainly would not do so if the standard of comparison was to be such as Mr. Fairlie proposes. This, however, is a point on which Mr. Fairlie must speak for himself. That a match between the "Tarapaca and one of the American engines on the Iquiqui line would be regarded with great interest by locomotive engineers on both sides of the Atlantic, we have no doubt whatever, and we ourselves should be much pleased to see such a match made on terms which would be fair to all concerned. This, however, is a matter on which we shall probably speak further when we know Mr. Fairlie's opinion on the subject.

We now come to the table of comparative performances annexed by Mr. Evans to his letter. We have already stated our objections to the standard of comparison he has employed (see lines 30, 32 and 34 of his "Table of Comparisons"), and with regard to this point, therefore, we need not do more than point out the vast difference which would have been caused in the figures given by Mr. Evans as representing the performance of the American engines, had the whole weight of engine and tender been used as the divisor in place of merely the weight on the driving wheels. It has been already stated by us, also, that in our opinion the allowance for friction of cars (5 lb. per ton) taken by Mr. Evans is too low—certainly too low for the English rolling stock, and most probably too low for the American; but, for the present, we do not intend to argue this point further. The engine friction Mr. Evans states that he takes at 10 lb. per ton; but inasmuch as in calculating the rolling friction at 5 lb. per ton, he includes the weight of the engine in that of the train, and then allows for the engine a further friction of 10 lb. per ton, the total amount of engine friction is, by his mode of calculating it, 15 lb. per ton, an amount which does not differ very greatly from that generally allowed by English engineers.

Even if we adopt for the present Mr. Evans' figures, however, as representing correctly the resistances overcome by the American engines, there are certain statements in his tables which we must confess ourselves utterly unable to understand. Thus, in the first place, we are informed in the table of comparisons that the "San Bernardo" exercised a tractive force of 11,590 lb., with a pressure of 115 lb. per square inch in the boiler. Now, as the "San Bernardo" has 16 in. cylinders, with 24 in. stroke, and driving wheels 56½ in. in diameter, the tractive force which it will be capable of exerting for each pound of effective pressure per square inch on the pistons will be

$$\frac{24\times16^2}{56.5}=\frac{24\times256}{56.5}=108.74 \text{ lb.}$$

Dividing 11,590 lb. by this amount, we get

$$\frac{11{,}590}{108.74}=106.56 \text{ lb.}$$

as the mean effective pressure per square inch on the pistons, which would be required to develop the tractive power stated. That a mean effective pressure on the pistons of 106.56 lb. should have been obtained with a boiler pressure of 115 lb. is a matter which no locomotive engineer would admit. If the car friction be taken at 6 lb. or 7 lb. per ton, instead of at 5 lb., as is done by Mr. Evans, the matter of course becomes still worse. Again, it is stated that the total foot-pounds of work done per hour by the "San Bernardo" was 1,040,318,400; but this is equal to the development of 525.4 effective horse power, and that such an enormous power should be developed by a 28-ton engine running at the speed of 17 miles per hour, we may, we think, be at least permitted to doubt. Inasmuch, moreover, as the steam would have to be admitted to the cylinders throughout almost the entire stroke, the development of such a power would require the evaporation of nearly, or quite, 300 cubic feet of water per hour; and yet we

are informed that in the case of the "San Bernardo"—an engine which it is stated in a pamphlet issued by Mr. Evans, has but 902 square feet of heating surface—the fire door "had to be kept open most of the time" to keep the steam down to the required pressure! But this is not all. In one of the trials made on the 19th of July, 1859, the "San Bernardo," we are informed, took over a portion of the line a train of 35 eight-wheeled cars, the gross load being 587.31 tons, and it is further stated that with this load a gradient of 37 feet per mile, or 1 in 142.7 was surmounted. Whether the gross load above given does or does not include the weight of the tender we cannot say; but we shall give Mr. Evans the benefit of the doubt, and suppose that it does. Under these circumstances the total weight of the engine and train would be 587.31+28.11=615.42, or say, 615.4, and the resistances calculated according to Mr. Evans' own data—and omitting atmospheric resistance and that due to oscillation—would be as follows:

	lb.
Resistance due to gravity	9,659
Rolling friction of entire train at 5 lb. per ton	3,077
Engine fricton at 10 lb. per ton	281
Total	13,017

Dividing this total by 108.84 (the number of pounds of tractive force developed for each pound of effective pressure per square inch on the pistons) we get $\frac{13,017}{108.74}$ 119.7 lb. per square inch as the mean effective pressure required in the cylinders to do the above work. But Mr. Evans' table states that the boiler pressure when ascending the gradient of which we have been speaking was but 102 lb. per square inch (!), and we do not find that at any time during the trial it rose above 120 lb; whereas a boiler pressure of 140 lb., or probably 150 lb., would have been necessary to give the mean cylinder pressure we have shown by calculation to be required.

With such doubtful points as these in Mr. Evans' records of the trials on the Southern Railway of Chili, we are compelled to reject those trials as untrustworthy. Mr. Evans evidently believes in them implicitly, but in the face of the facts we have pointed out, we certainly cannot do so. It must be apparent to any one who will take the trouble to investigate and compare the various facts recorded in Mr. Evans' tables, that grave errors must have been committed in ascertaining either the inclination of the gradients surmounted, the amount of the load taken up, or the pressure of steam used. In which of these three things the error was committed we, of course, cannot say, but most probably it was in the last mentioned. In the case, also, of the performance of the "San Bernardo," given in the comparative table, we fear that the work done by the engine during a short "spurt" has been taken as representing that which it could perform continuously; at least, in no other way can we account for the enormous power which the engine is stated to have developed. As for the co-efficients of adhesion stated to have been obtained, those we believe also to have been over-estimated, by neglecting to take into account the additional weight thrown upon the hind wheels of engines of the "San Bernardo" and "Conquistador" classes when pulling a heavy load.

In conclusion, we must state that although we have been compelled to disagree with him on many, yet we by no means desire to disparage American locomotives. We believe that they are engines admirably adapted for the special class of work they have to perform, and that they are, in fact, far better suited for that work than locomotives of the ordinary English type would be; but we cannot on that account admit them to be better for *every* class of work as Mr. Evans apparently desires we should do.—*Engineering.*

A Great Railroad Station in London.

Considerable progress is being made with the completion of the great Midland Railway Station at St. Pancras. This magnificent structure, which is unrivalled for its architectural features as well as for the extent of its accommodation, was, as our readers are aware, designed by Gilbert Scott, the famous Gothic architect, who has shown how well his favorite order may be applied to the requirements of even a railway station. The site upon which this magnificent terminus stands, facing to the Euston-road, was formerly known as Egremont place and Judd place East, bounded on the west by the eastern side of Skinner street, upon the east by the opening to the terminus of the Great Northern, which it has so completely thrown into the shade, and by the Old St. Pancras road. It has displaced upwards of thirty streets, some of them very considerable thoroughfares, and places occupied by upwards of 800 houses, and containing prior to their destruction a population of about 20,000 persons. Amongst the principal streets, &c., displaced, are the before-mentioned Judd place East and Egremont place, in the main road, and east side of Skinner street, and the whole of Brewer street, which formed the continuous line from the Euston to the St. Pancras roads, entering the latter at the point near Elstree street, where the St. Pancras road is crossed by the stupendous iron bridges of the Midland Railway. Running east and west between Skinner street and Brewer street and St. Pancras road were Weston street, Smith street, Denton street, and Perry street. There were also the noted "Brill," with Brill yard, Perry terrace, Hertford street, Hertford place, West street, Thornley place, Weston place, Mary place, Brill row.

The walls of the station are built of bricks from Nottingham and Leicester, the facings being composed of pressed bricks. All the salient angles are formed of these pressed bricks, rubbed and moulded to an even surface. The admittance of cutting brick in arches, forming the contrast between brick and stone alternate, are from Reading. All stone forming the moulded portion, not unduly exposed to weather, is from the Ancaster quarries. Stone from Hilton, as also the red "Mansfield" and "Dumfries," are used for the weathered and constructive portions. All constructional shafts are of the pollshed red and grey granite, those to the ground and first floors being red, the remaining shafts upwards being grey granite; Irish and Derby marble being used for interior shafts. The total length of the building is 850 ft.; its breadth, from end to end of wall being 500 ft.; and its height, from base to summit, 115 ft. That portion to be appropriated to the hotel will contain 280 separate bedrooms, twenty private sitting rooms, and thirty-four dressing rooms for visitors, in addition to public coffee and dining rooms, sitting rooms, board room offices, and accommodation for staff and servants of the establishment.

The principal features of the elevation show that when completed the front will be flanked by two towers at the extreme ends, one forming the pavilion or departure gateway. The eastern tower will be the clock tower, with the oriel window, and containing a dial face on all sides, will terminate with a timbered spire, covered with slates and ornamental lead work, with large pinnacles corbelled out at the angles, and will be a most prominent feature, inasmuch as it will stand 250 ft. in height to the summit of the spire, and will thus be the highest steeple in London, with the exception of St. Paul's. The whole of the basement story comprises cellars let for storage, a large portion being already occupied as ale stores by large brewers, such as Salt & Co., Ind, Coope & Co., Tetley & Co., and others. The height of this story is 15 ft. The ground floor, which enters upon the stupendous terminus of the railway line, and contains the various booking and clerks' offices, coffee, cloak and refreshment rooms, &c., is to the ceiling under the first floor in height 21ft. The first floor, which, in addition to the directors' board room and offices for high officials, ladies' drawing, and coffee and dining rooms for private parties, is also fitted for 24 bedrooms, 12 dressing, and five sitting rooms. The height of this story, from first to second floor, is 19ft. The second floor contains 51 bedrooms, 10 dressing, and 10 sitting rooms, and is in height 16ft. The third floor contains 50 bedrooms, 12 dressing rooms, and four sitting rooms, the height being 14ft.; whilst the fourth and fifth floors will contain 154 bedrooms, exclusive of rooms for servants and attendants. The height of the fourth floor to the fifth, is 11ft., and of the 5th 9ft. The communications through the building are carried out with the most elaborate detail. The main archway leading to the platform passes through the commencement of the second story, while the side cloisters only rise to the height of the first story; and the departure gateway forms a pleasing feature, having a large groined archway with richly carved cloisters for foot passengers. The communications of the first floor are carried across the main archway by means of an ornamental girder enclosing the passage, and this portion of the elevation is pleasingly broken up and surmounted by a noble gable, flanked at base on either side with chimney shafts. West of the departure gateway the elevation is broken up by two oriel windows of considerable proportions, corbelled out from the construction piers. These are carried up to the level of the main parapet, where a gable feature commences, being in a line with the main hall, containing a horizontal three-light window head, with a six foil circle, bounded by a comprising arch. This combination forms a feature of great elegance and lightness of appearance. The whole of the ground floor windows are extremely bold in their treatment, with great fullness of detail. The arches are semi-circular, and the inner order contains a triple crisp in the head. The arches have brick interspersed with the stonework, and are of one breadth of opening. The outer order forms the arcade treatment of this story. The whole of the first floor windows have great richness of details, and are divided by a granite shaft forming two light windows. The shafts supporting the tracery have elaborately carved capitals, and bases resting on sub-bases, with groups of statuettes round the same. These windows have a free distribution of brickwork in the outer order of arch, and balconies in front of them, supported upon carved cornices and bracket. The windows of the second floor are also balconied, and are of similar character to those of the ground floor, with the exception that they have obtusely pointed arches with trefoil crisping. The third floor windows are arranged in two and triplet lights, having double mullion shafts, one passing down in front of dado, and the other standing upon the sume, the latter formed into a sunk panel, with a free treatment of brick, stone, and granite shafts with carved capitals. The windows of the fourth and fifth floors are similar, being of ornamental wood dormars of bold design and construction. The main parapets and cornice, with its corbelled carved and open arcade, form the crowning feature, and are a most pleasant termination to the general front elevation. York stone is employed for all the steps and landings, the roofs are being covered with green Swithland slates from Leicestershire, with Vielle Montagne zinc to flats. The ground floor is arched with brick and wrought iron girders. The floorings are fire-proof; the first, second, and third floors are arched with wrought iron constructional girders, and trellis girders forming centering ribs to corrugated sheet iron placed over the same, upon which is placed Barrow lime concrete, a method suggested by Mr. Gilbert Scott, and since patented by Messrs. Moreland & Son. Plate glass to be applied to all the windows, in most cases the size of the divisional opening. Messrs. Jackson & Shaw are the builders of the hotels which form the frontage. This building when completed will, without doubt, be one of the greatest ornaments of the metropolis.—*London Railway News.*

—James R. Kendrick, late General Superintendent of the Concord Railroad of New Hampshire, has gone to New Orleans to take the superintendency of the New Orleans, Mobile & Chattanooga Railroad, lately opened between New Orleans and Mobile.

Manufacture of Bessemer Metal in the Valley of the Great Lakes.

Lieut. C. E. Dutton, who is contributing to the New York *Times* a series of very valuable letters on the iron and steel manufactures of the United States in a recent letter from Cleveland, after pointing out the necessity of peculiar qualities of ore for Bessemer metal, has the following account of the advantages of the different sections for the manufacture of that metal:

Turning to our own country, we have an unlimited supply of good ore and good coals, but distances are so great, and the variety of geological formation so extensive, that the simple fact that they are both to be found in the country is no guarantee of cheapness. So far as the Eastern States are concerned, if there is a single ore deposit from Lake Champlain to Alabama, which is known to be capable of making Bessemer pig, those who know it have deemed proper to keep silent about it. And yet, with every geological horizon, from the Laurentian to the Post-tertiary, it would be marvelous, indeed, if some, and indeed, if many of their ore beds do not contain an abundance of it. The truth is, very little effort has been made to ascertain whether such were to be found.

In the Western States there are two regions which abound in good ores. Indeed, there is every reason to believe that more of them exist in either region than in the whole of Europe, and many times more. These are the Lake Superior and Missouri iron regions. It is impossible to convey any idea of the vast extent of these deposits, or the facility with which they may be mined. It is sufficient to know, that the supply ts exhaustless, the quality unsurpassed, and that they can be mined with ease. Several hundred miles of water tronsportation intervene between the Lake Superior ores and cheap fuel, but there is no reason why they may not be brought together at a very moderate cost, any where on Lake Michigan, when the demand for them becomes sufficiently active. A railway from Chicago to the Indiana coal fields, a railway from Green Bay into the iron region, and a fleet of vessels specially built for carrying ore and coal, would reduce the cost of uniting them to a point as low as is now reached in the Lehigh Valley, and much below the average cost of furnace materials in the State of Pennsylvania, as is evident from the fact that Lake Superior ores are carried to Aarrisburg, and Iron Mountain ores to Pittsburgh, at a cost exceeding eleven dollars per ton, and smelted at a good profit. These are no conjectures, but are real schemes and enterprises already in prospect, and engineered by men who have accomplished others of equal magnitude.

The importance of the pig iron question to the Bessemer process now becomes apparent. The Troy and Harrisburg Works are importing Cumberland iron at a cost which is probably in excess of forty dollars per ton, and the Cleveland Company use charcoal iron, which cannot cost very much less. Reckoning the loss by conversion, the iron for a ton of steel rails costs $45 to $50, or very nearly half the market price. In the Hudson and Lehigh Valley, in case ore could be found favorably located, the iron ought not to cost more than $25 to $27 per ton. At Cleveland, with semi-bituminous coal and Lake Superior ores, the cost should not exceed $28 per ton. At Chicago, with present facilities, it ought not to exceed $27, and with those I have mentioned as in prospect, ought to be less than $22 any where on the coasts of Lake Michigan.

A Cheap Railroad in Scotland.

British journals are commenting on the extraordinary cheapness of a new railroad constructed in Scotland by the capital under the immediate direction of the Duke of Sutherland. The cost was £3,700 per mile, or about $18,500. The following official report by Captain Tyler describes it:

This portion of railway is laid with a single line, and is about 14½ miles long. The steepest gradient is 1 in 60. The sharpest curve has a radius of 20 chains. The rails are in lengths for the most part of 22 ft., and weighing 75 lb. to the lineal yard. The joints are fished with wrought-iron fish-plates, and four screw-bolts and nuts. The sleepers are of Scotch fir, 9 ft. long, with an average section of 9½ in. by 4¾ in., and a minimum section of 9 in. by 4¼ in.; and they are laid transversely at an average distance of 2 ft. 9 in. apart They are slabbed to an inclination of 1 in 20, for the reception of the rails, which are secured to them by a large proportion of fang-bolts. The ballast is of gravel and shingle, and is 11 or 12 in. deep below the underside of the sleepers. The fencing is for the most part constructed with seven lines of twisted galvanised wires, the upper wire being of larger diameter than the remainder, on timber supports 9 ft. apart, and shorter intermediate posts stapled to the four lower wires. About two miles of th fencing is of stone walling 4 ft. 6 in. to 5 ft. high. There is a short siding at Dunrobin, and a similar one at the temporary station at West Helmsdale; but as yet there is no other break in the rails of the main line. Platforms, with a view to passengers entering or leaving the train, have been provided at Brora and Loth, at distances respectively of four and a half and nine and a half miles from Dunrobin. There are nineteen bridges under and one over the railway, constructed with iron girders, oak beams, or masonry arches on masonry abutments. They are all of a substantial character, and have been carefully constructed. The longest span is 60 ft., for the arch carrying the railway across the Brora River, at an elevation of 45 ft. The largest opening covered by iron girders is 29 ft. in the skew, for the public road passing under the railway at Strathsteven. The deflection of the girders in this case was rather less than ½ in. under the only engine on the line. I found the permanent way in excellent order, and am happy to be able to report my opinion that the Board of Trade may safely sanction the opening of this railway for public traffic.

Common Carriers Cannot Contract Against Liability for Loss by their Negligence.

In the case of Allen *vs.* the Cleveland & Pittsburgh Railroad Company, appealed to the Supreme Court of Indiana by the defendant, the main question was on the construction of the contract, which had the following provisions:

"That whereas said railroad companies transport live stock at only first-class rates, as per their tariffs, excepting only in the cases where the owner assumes certain risks and incidents specified below, in consideration of obtaining the transportation at reduced rates; and whereas the said party of the second part, in the present case assumes, and takes upon himself said risks and incidents for said consideration; now, therefore, in consideration that said railroad will transport for the said party live stock at the reduced rate of—— dollars for single decks and —— dollars for double decks, per car load, from Indianapolis to Buffalo, and charges advanced, the said party of the second part does hereby agree to take and does hereby assume all and every the risks of injuries which the animals or either of them may receive in consequence of any of them being wild, unruly, vicious, weak, escaping, maiming and killing themselves or each other, or from delays, or in consequence of heat, suffocation, or the ill-effects of being crowded upon the cars of said railroad companies, or on account of being injured by the burning of hay, straw or any other material used by the owner in feeding the stock or otherwise, and for any damage occasioned thereby; and also all risk of any loss or damage which may be sustained by reason of any delay, or from any other cause or thing in or incident to, or from, or in, the loading or unloading said stock. And it is further agreed that the said party of the second part is to load and unload said stock, at his own risk, the said railroad companies furnishing the necessary laborers to assist, under the direction and control of the party of the second part, who will examine for himself all the means used in the loading and unloading, to see that they are of sufficient strength, of the right kind, and in good repair and order. And it is further agreed between the parties hereto that each and every of the persons riding free, to take care and charge of said stock, do so at their own risk of personal injury from whatever cause. And the said party of the second part, for the consideration aforesaid, hereby releases, and agrees to release, and to hold harmless, and keep indemnified, the said party of the first part, of and for all damages, actions, claims, and suits, on account of any and every injuries, loss and damages heretofore referred to, if any occurs or happens."

In deciding the case, Judge Gregory delivered the following opinion:

The injury complained of is thus charged in the complaint "that while said hogs were in the care, custody, "and possession of appellants, and while on their "cars, and upon their said railroad, by reason of the "insecure and insufficient doors, shutters, slides, and "windows of defendant's cars, and the fastenings "thereto, and by reason of the want of care and dili-"gence of defendant in safe keeping, securing, carry-"ing, transporting, and shipping said hogs, six of them "escaped from said defendant's cars, through the in-"sufficiency of the fastenings of the doors, shutters, "slides, and windows aforesaid, and defendant's negli-"gence."

The second paragraph of the answer sets up the special contract, and that the hogs were loaded and transported in pursuance thereof, under the direction and control of the plaintiff, the company furnished the cars and necessary laborers. A demurrer was sustained to this paragraph of the answer.

A trial was had under the general denial; finding for the plaintiff; motion for a new trial overruled.

The evidence shows that the hogs were shipped under this contract; that they were loaded by an agent of the plaintiff, who accompanied them to Buffalo; that the six hogs probably escaped through a little window that was open at the upper deck of one of the cars; that after the escape of one of the hogs, the agent of the plaintiff told the coductor to fix the window, but he did not do it, and the agent fixed it himself.

It is claimed that under the contract the appellant is not liable for this loss.

In Lee *vs.* Marsh, 43 Barb, 102, there was an express stipulation against liability for loss "that may happen "from any other cause than the wilful negligence or "fraud of said receiver or his agents." In the case at bar there is no such provision. It is true, that the language of the contract is broad enough to cover loss from any cause whatever; but in The Michigan Southern & Northern Indiana Railroad Company *vs.* Heaton, at this term, after a careful examination of the subject, this Court came to the conclusion, that a contract as broad in its terms as the one under consideration, did not cover liability for loss occasioned by ordinary negligence. Indeed, it is held in that case, that a common carrier cannot contract against liability for loss from his own ordinary negligence; that such a condition is void as against public policy.

The railroad company had the exclusive possession and management of the cars in their transit: the shipper was to load and unload, but this did not include the time embraced in operating the train in the course of transportation, during that time, in the very nature of things, the company controlled it. The evidence shows a case of want of ordinary care on the part of the agents of the railroad company. The Court committed no error in sustaining the demurrer to the second paragraph of the answer, or in overruling the appellant's motion for a new trial.

Judgment affirmed.

The Union Pacific Lands.

The Union Pacific Railway Company has under consideration plans for irrigating the thousands of acres of land along its route. This is entirely feasible for three-fourths of the land owned by the company along its route. Nearly every foot of the company's lands between Omaha and Cheyenne can be watered by ditches from the Platte, Lodgepole and Crow creeks. West of Cheyenne about forty miles of the route of the railroad, comprising the eastern and western slopes of the Black Hills, can never be irrigated, on account of its altitude. The only portion of that section which can be made available for agricultural uses is the low valleys, which need no irrigation. Westward of the Black Hills thousands of acres of the great Laramie plains, can be easily watered by the Big and Little Laramie rivers. This will take us west of Cheyenne a hundred miles. Beyond this little can be done in the way of irrigation except in scattered localities. The wilderness of Alkali lands, between Ft. Steele and the forbidding wastes of the higher ridges occupying the crest of the continent as it were and described by Gen. Dodge, of the Union Pacific railroad, as "Red Desert," and the dreary space known as "Bitter Creek Valley," will never have a value other than for its deposits of mineral. The extreme western portion of the line of the Union Pacific, will be settled considerably in the course of time, there being a number of streams in that section and timber convenient. The final realization of the plans of the Union Pacific in regard to irrigation will take years for development, but will, when consumated, open up for settlement lands, from which produce will always have a ready market. The expense of irrigation of lands east of Cheyenne on the Union Pacific Railroad will advance the price of lands about about one dollar per acre. Next to government aid in projects for extensive irrigation, the action of the Union Pacific would prove of most inestimable value to the settlers along its line.—*Cheyenne Leader.*

Narrow Gauge Railroads in America.

Mr. Henry F. Q. d'Aligny, a New York engineer, writes as follows to the *United States Railroad and Mining Register:*

I have read with great interest the article on "Economy of Narrow Gauge Railways," published in your last issue, No. 752, November 5, 1870. The writer is perfectly correct in his views, and his suggestions are right; I beg leave to state that his hopes will soon be realized. In a short time there will be branch roads built on the "Narrow Gauge Principle" (2 feet 6 inches) for the general transportation of minerals, freight and passengers.

It is contemplated that the first road will be constructed this coming winter in the Hanging Rock Region of the Ohio river (Kentucky), for the purpose of connecting the Iron Hills mines with the Eastern Kentucky Railroad, which has its terminus and landing at Riverton on the Ohio river.

In view of the construction of this branch road (9 miles), Mr. Matt. Ellis, the President of the Iron Hills Railway Company of Kentucky, has, for the past three years, examined and studied the different systems of narrow gauge roads established in several mining districts of Europe.

Belgium—from Antwerp to Gand	3 ft. 8 in.
France—from Commentry to Montlucon	3 ft. 6 in.
" Mondalazac Railroad (branch of the Paris & Orleans Railroad)	3 ft. 6 in.
" Creuzot	2 ft. 8 in.
Prussia—Broelthal Railroad	3 ft. 8 in.
" Luisenthal (300,000 tons traffic, 10 miles long.)	2 ft. 4½ in.
England—Festiniog & Partmadoc Railroad	2 ft.

The Festiniog road being the narrowest and also having been the first worked and equipped, Mr. Ellis spent considerable time last summer inspecting this road in company with Mr. C. E. Spooner, the Engineer and Superintendent of the company.

Mr. Ellis has obtained from Mr. Spooner all the official reports, maps and working plans relating to the construction, equipment and working of the 2 feet gauge Festiniog road, and also has caused Mr. Spooner to make original manuscript reports and comparative estimates, showing the immense advantages and economy which may be secured by establishing 2 feet 6 inch road instead of 4 feet 8½ inch or any other broad gauge.

From the inspection of these papers, which can be consulted at Mr. Matt. Ellis's office (No. 4 Broad street, New York), I hastily clip the following results:

TABLE OF COMPARATIVE EARNINGS AND EXPENSES FOR THE HALF YEAR ENDING DECEMBER, 1869.

NAME OF ROAD.	Percentage Working expenses to gross rec'pts.	Gross amount carried per train mile	Expense of working per train mile.
Festiniog & Portmadoc*	44.5	10s.39	4s.60
London & Northwestern.	47.84	5s.77	2s 76
Great Western	48.616	5s.495	2s 67
East Indian	49.4	8s.1	4s.
North London	52.7	5s.44	2s 86
Metropolitan	54.	5s.19	2s.80

* Which includes all the extraordinary charges—for alteration of road, and stocking it, &c., &c.

The regulation speed, as per charter, on the 13 miles of the Festiniog road, is 12 miles per hour, over continuous ascending gradient. Maximum, 1 foot in 68 69-100; minimum, 1 foot in 186; Average, 1 foot in 92. Total ascent, 700 feet.

Sharpest curves, 1½ chains (75 feet) in radius. On the Creuzot road (France) they have curves 45 feet in radius on a 2 feet 6 inch gauge.

Mr. C. E. Spooner has made several practical experiments on speed, and has obtained with full safety 35 miles per hour on a straight road, and 20 miles per hour on the sharpest curves.

The locomotives weigh from 8 to 19 tons in steam, the usual carrying load of the Fairlie 19½ ton engine being 90 tons over the average gradient, 1 foot in 92, exclusive of the weight of engine, at an average speed of 15 miles per hour.

The length of trains with this engine is from 900 to 1,200 feet, and often on the road the train has to wind its way on three curves at one time.

TRAFFIC FOR 1869.	Tons.	Cwt.	Q.
Mineral traffic	118,132	7	2
Goods	18,600	0	0
Total Gross weight hauled, exclusive of engine	241,617	0	0
Number of passengers	97,'00		

ROLLING STOCK.	
Number of locomotives (3 generally in steam)	7
Passenger carriages	14
Quarrymen's carriages	32
Goods, coal and lime trucks	40
Slate trucks	852
Total of rolling stock	945

These figures speak for themselves to the practical railroad men. They are the result of years of most successful operations, which have returned to the stockholders 29½ per cent. of their original investment.

The following statement is from the report for 1869 of the Festiniog Railroad:

	£	s.	d.
Total receipts for 1869	23,676	12	10
Total expenditures	13,053	17	10
Net revenue	10,622	15	00
Capital of the company	36,185	10	0C

The object of the company which Mr. Matt. Ellis is now organizing, and which so far may be called "The United States Narrow Gauge Railroad Company," is to build on contract roads and branch roads to connect mining (especially) or manufacturing districts with main trunk roads throughout the United States. Most of the railroad constructors, locomotive and car builders, as well as rolling-mill masters, are to be instructed in this enterprise.

At present the company expects to build branches or feeders to main trunk roads, but I am convinced that ere long many through single roads, 4 feet 8½ inches or broader, will substitute the standard narrow gauge, 2 ft. 6 in., for their gauge, and establish a double track, as the road-bed would be sufficiently wide, which will afford security to passengers and speed in commercial transactions.

The economy of the construction and equipment of a narrow gauge road, 2 feet 6 inches, is immense when compared with the cost of a road 4 feet 8½ inches. For a single track it is 50 per cent over an ordinary flat country; but in mountainous or mining districts the proportion increases to 75 per cent and more. In fact a narrow gauge road can be established and will prove a paying concern in countries so rough that no attempt would ever be made to construct a road of the usual 4 ft. 8½ in. gauge.

I am aware that many arguments are now brought against the narrow gauge railroads by people accustomed to a certain routine in railroading. But I close these hasty remarks by saying that within a very short time the standard narrow gauge roads will accomplish a revolution in our railroad system of the United States.

It was my good fortune to be appointed in 1867 one of the ten Scientific Commissioners for the United States at the Paris Universal Exposition, and I had all opportunities to officially ascertain all these facts above mentioned. Since I have the honor of being elected a member of the American Philosophical Society of Philadelphia, I expect to prepare a special paper to be read before this honorable and scientific body, on the subject of narrow gauge railroads.

The American Steamship Company of Philadelphia.

At a meeting of the Board of Directors of the Pennsylvania Railroad Company, on Wednesday of last week it was

Resolved, That the Pennsylvania Railroad Company will unite with the Commercial, manufacturing and industrial interests of the city of Philadelphia in the establishment of a line of not less than four steamships, to be built in the United States, to ply between this port and Liverpool, or other European port, upon the following general basis:

A charter for the organization of a steamship company, to be obtained from the Legislature of Pennsylvania at its next session—the minimum capital of such company to be $700,000, with power to increase it to $5,000,000.

The Pennsylvania Railroad Company will subscribe for $400,000 of said capital, on condition that $300,000 be subscribed by other responsible parties.

Bonds of the said steamship company, payable in twenty-five years, bearing 5 per cent. interest, gold, free of taxes, to be issued to the amount of $1,500,000, which bonds, in the event of the steamship company failing to pay, shall be purchased, principal and interest, by the Pennsylvania Railroad Company at the par value thereof.

The title of the company to be "The American Steamship Company of Philadelphia."

The following named gentlemen have been selected as the American Steamship Company committee on behalf of the Pennsylvania Railroad Company: E. C. Knight, Chairman; S. T. Bodine, John Rice, Wistar Morris, Washington Butcher, Josiah Bacon and Lewis Elkin, with whom are associated Mr. J. Edgar Thomson, President of the company, and Mr. Thomas A Scott, Vice President.

—Deputy Commissioner Douglass, of the Bureau of Internal Revenue, has directed that the collection of the contested tax on the dividend of the New York Central road, which amounts to $1,000,000, be postponed till the parties in interest can have further hearing. The officers of the road claim, as their main defence, that, instead of making the actual dividend of the amount named, they issued twenty-three millions of additional stock and distrlbuted it among the shareholders, and that in such transactions the law regarding dividends does not apply.

—At a recent council of passenger men in St. Louis it was decided to open a ticket office in London where tickets for all places in America will be sold at regular rates and trustworthy information given as to routes and rates.

General Railroad News.

MECHANICS AND ENGINEERING.

Improvements in Sleeping Cars.

The St. Louis *Democrat* describes as follows certain improvements in sleeping cars which have been invented and patented by Joseph S. Du Bois, the inventor, who is a conductor on the Pacific Railroad of Missouri, and Mr. Thomas Dorwin, of Leavenworth, Kansas, the General Southern Agent of the Ohio & Mississippi Railroad:

"According to the arrangement of the sleeping cars now in use, the seats composing a section are made to face each other. This obliges, if the car is full, half of the passengers to ride backwards, which is not only inconvenient, but decidedly unpleasant to many persons. Another objection lies in the fact that strangers are thrown together in the same compartment, and often ladies are subjected to considerable annoyance from this fact. Mr. Du Bois' invention is designed to do away with these difficulties. According to it the seats are so arranged that during the day all of them face in the direction of the car's motion, as is usual in ordinary passenger cars. Being set on a pivot of a peculiar construction, they are capable of being turned around so as to face in any position required. At night they are placed in the manner similar to those of the common sleeping car, and are then ready for the reception of the bedding. In addition to this improvement there is also another, the advantage of which will be apparent at a glance. The rods which support the upper berths are made with joints so that during the day they may be folded up and changed to a horizontal position parallel to the car's length. This gives a light and airy appearance to the car, and removes what is sometimes an inconvenient obstruction.

"The patent for the improvements is dated November 8th, and has just been received by the inventor. Cars, we understand, are soon to be constructed which will illustrate to the public the advantages thus secured."

Rolling Car Axles.

On page 99 of the current volume of the RAILROAD GAZETTE we published a description of a rolling machine for shaping car axles which was read before the Mechanical Section of the British Association by Mr. Alfred Bowater. This paper left it to be inferred that the machine was the invention of the author of the paper or of the firm with which he was connected. A late number of the Cincinnati *Merchants' and Manufacturers' Bulletin* copies this paper and says that it describes almost exactly a machine invented and patented by Thomas Cooper, of Cincinnati, and that even the wording is similar to that of Mr. Cooper's circular. Mr. Cooper has patented his invention in England so if there has been really an infringement, he will have his remedy. It is possible, however, that there has been one of those remarkable coincidences in invention which sometimes occur. Mr. Cooper claims that his machine will turn out 20 or 30 axles per hour. It will cost about $5,000. None has been constructed yet, the inventor not having sufficient means.

Street Cars with Roof Seats.

The *American Railroad Journal* describes as follows certain novel street cars which have been built lately by John Stephenson & Co., of New York:

"They differ from those generally in use in this city, by being provided with broad winding stairways from each platform to the roof, where seats are ranged in equal number to those in the body of the car; the entire car load seated thus being forty-four persons. Upon the sides of each car is the inscription, 'Tramway de la Bocay Barracas.' They are intended for an English company, and are to be used in the city of Buenos Ayres. With the exception of being slightly narrower and possessing the roof accommodation mentioned, these cars are the same as those used in this city, and will cost, when delivered at their destination, eleven hundred dollars each. Thirty is the number of the present shipment. fifty having preceeded them.

The same firm lately shipped an omnibus to the Canary Islands, and are filling like distant orders. The roof cars now in use in London were made by John Stephenson & Co., but differ from the present make in only being provided with a single ladder, which is moved as occasion requires to the rear platform of the car."

Broad and Narrow Gauge.

A party, consisting of Mr. Salmon Shaw, President of the Buffalo & Springville Railroad Company, and others, lately visited the Toronto, Grey & Bruce Railway in Canada to examine the working of the narrow gauge and get figures as to the cost of construction. They present the following comparative statement of the cost of permanent way on narrow and broad gauge roads:

FIVE FEET SIX INCH LINE.

100 tons rails at $50 per ton	$5,000 00
Fish plates, bolts and spikes	800 00
Sleepers, 2,263	700 00
Ballast, 3,000 cubic yards	1,200 00
Tracklaying	400 00
Total	$8,100 00

THREE FEET SIX INCH LIEE.

60 tons rails at $50 per ton	$3,000 00
Fish plates, bolts and spikes	400 00
Sleepers, 2,263	500 00
Ballast, 2,250 cubic feet	900 00
Tracklaying	300 00
Total	$5,100 00

Railroad Manufactures.

The Casco Iron Works at Falmouth, Me., are again running, and now employ 30 hands, making a specialty of axles and car work in general.

The Pullman Palace Car Company,(of which George M. Pullman is President, H. R. Pierson, Vice President, and Charles W. Angell and W. A. Angell, Secretary and Purchasing Agent respectively,) which recently bought out the Detroit Car & Manufacturing Company, contemplate making many improvements upon their premises. The works occupy an entire block, bounded by Croghan, Dequindre, and Macomb streets and St. Aubin avenue, and the principal portion of their machinery is in an old wooden structure. This is to be torn down, and replaced with a brick building, and the offices are to be located at the corner of Croghan and Dequindre streets. A large blacksmith shop is also to be erected on the corner of St. Aubin avenue and Macomb street, and other buildings are to be put up as desired for the convenience and use of the company, which is engaged exclusively in the manufacturing and repairing of dining and sleeping cars. Of the works, C. F. Allen is General Superintendent, Benjamin M. Tiffany, Superintendent, and A. Longstreet Mechanical Superintendent. The enlargement of the works will give employment to an additional number of persons, and make them an ornament to the city.—*Detroit Tribune.*

The Columbus car and car wheel works, John L. Gill, proprietor, cover four acres. They have been in operation since 1864. The greater portion of the buildings are of brick and stone. They employ 250 men. They have capacity for turning out 4 gondolas daily, or 12 to 15 box cars. The Pittsburgh, Cincinnati, & St. Louis Railway is supplied from these works. Cars are being built for the following railroads: Springfield & Illinois Southeastern, Columbus & Hocking Valley, Baltimore & Ohio, and Peoria & Rock Island.

OLD AND NEW ROADS.

St. Lawrence North Shore.

The government at Quebec proposes to grant 3,000,000 acres of land in aid of the construction of a railroad along the north shore of the St. Lawrence, connecting Quebec with Montreal and Ottawa.

Cape Cod.

A branch of this railroad is to be constructed from Monument at the head of Buzzard's Bay, southward along the east coast of that bay to Wood's Hole, the southwestern extremity of Barnstable county, a distance of about 18 miles, passing through the village of Falmouth, which has voted $60,000 in aid of this line.

Mazomanie & Sauk City.

A committee of citizens have been informed by the officers of the Milwaukee & St. Paul Railway Company that that company will construct a branch of its Prairie du Chien line from Mazomanie northward ten miles to Sauk City if the inhabitants of towns on the line will contribute $50,000 towards it. It is estimated that the total cost of the branch will be $200,000, the bridge over the Wisconsin alone costing $46,000.

Virginia Valley.

The Monroe (W. Va.) *Register* says there is a report current there that the Baltimore & Ohio Railroad Company, and other wealthy patrons of the Virginia Valley Railroad, have an agent in Monroe county who is examining a route for the extension of that road down the valleys of Potts and Indian creeks, thence on through Tazewell to Cumberland Gap, continuing to Memphis, Tennessee. The report says that this is a favorite project of the Baltimore captalists.

Hempfield Railroad.

We are informed by one who has been looking after this county's interest in the Hempfield Railroad, that the road bed, rolling stock and depots belonging to that corporation were sold in Pittsburgh last Monday. President Garrett, of the Baltimore & Ohio was the purchaser. We understood the price paid to be fifteen thousand dollars. Should this prove to be true, we are inclined to the opinion that a bright future is in store for the Hempfield as it will in all probability be extended to some point on the Pittsburgh & Cumberland road, now rapidly approaching completion. The distance to Cumberland by that route would be only 150 miles, or fifty miles shorter than *via* Grafton. This saving of distance and the time lost in overcoming the high grades on the present route, would reduce the time required to reach Cumberland from this city three or four hours—a consideration with those who regard their time as money. We hope the connecting link from Washington, Pa., to the Pittsburgh & Cumberland road will be speedily built.—*Wheeling (W. Va.) Intelligencer.*

Suspension Bridge & Erie Junction.

The efforts of Commodore Vanderbilt to blockade approaches to the Niagara Suspension Bridge against the Erie's new lines have failed. The Supreme Court at Syracuse, on the 25th ult., rendered a decision that an allowance of $5,000 was sufficient to remunerate the Central for the use of the crossings, and condemned the proceedings of the Central authorities in obstructing the approaches to the bridge. The Erie Junction & Suspension Bridge Railroad will be immediately completed, and will probably form the outlet for the traffic of the Great Western Railway until it has completed its Canada Air line.

Albany, Sand Lake & Stephenson.

The Troy *Whig* of November 12th says there have been several surveys of the new railroad which is to connect with the New York Central & Hudson River Railroad at East Albany, and run thence through Sandlake to the Hoosac tunnel. The last of these surveys has just been completed, and it is thought the route thus laid out will be the one adopted. It has been found thnt the best grade can be obtained by passing north from Albany to within a mile of Troy, whence the road is to be turned eastwardly through Sandlake. It is claimed that this road will cut off forty-six miles of the distance between that vicinity and the tunnel, as traveled on existing roads.

Toledo, Wabash & Western.

This company is sued for $40,000 damages because its trains do not stop at Jacksonville "twenty minutes for refreshments," as was the understanding when the depot and hotel were built.

Northern Pacific.

The rails were laid two weeks ago for twenty-five miles west of the junction with the Superior & Mississippi Railroad. John Ross, who has charge of the construction on this part of the line, has in use four of Otis' steam shovels, each of which cost $12,000. The summit between Lake Superior and the Mississippi is nineteen miles from the junction, between Peach Lake and Island Lake. Here the elevation is 760 feet above Lake Superior, and 1,394 feel above the sea. The Duluth *Minnesotian*, from which we obtain the above information, describes the route beyond as follows:

"The road beyond the summit passes for seventeen miles through a hardwood forest. The present route of the railroad is a little south of west to the Rabbit chain of lakes, and thence it turns nearly *due south* (!), and follows a line nearly parallel to the river for twenty-five miles to the Mississippi crossing or Brainerd. The country along the line of the road from the junction out is admirably fitted for railroading purposes; the best kind of gravel occurring at sufficient intervals to render the ballasting of the track easy and cheap and first-class."

Brainerd, which has been adopted lately as the name of the crossing of the Mississippi, is fourteen miles above Crow Wing.

The telegraph announces that this company purchased, on the 22d inst., the property of the St. Paul & Pacific Company, comprising the main line from St. Paul westward to Willmar, and a branch up the Mississippi from a point on the main line ten miles above St. Paul to Sauk Rapids, 66 miles.

Lansing & Ionia and Detroit & Lansing.

The Detoit *Post* of the 24th says:

"The Lansing & Ionia Railroad is built from Lansing to Greenville, a distance of fifty-seven miles. It has cost, in the form of stock and contributions, under the laws of Michigan, actually expended, about $300,000. It has a mortgage debt of $1,070,000. It has been opened and running only about a month, is inadequately equipped, and has a floating debt, in small sums, of $160,000. Tbis shows the total cost of the road to be $1,530,000. From Detroit to Lansing the Detroit, Howell & Lansing Railroad has been commenced, and about one-half of the work of grading has been done The whole distance is eighty-two miles. The bridging for that distance is done, and about 40,000 ties are on the ground. This work has cost about $300,000 expended, but about $50,000 of this is a debt of the company. Both these companies are embarrassed, and offer to transfer the roads and stock in the respective companies to parties who will build the roads. It is

proposed to consolidate these two corporations and issue bonds to the amount of $3,000,000 for the purpose of completing both roads from Detroit to the intersection with the Grand Rapids & Indiana Railroad, and to secure them by a general mortgage upon the consolidated road for that amount, in all, including the $600,000 already expended, to $1,000,000. We understand that negotiations for securing the requisite capital are now pending, but it is not certain that they will be successful, or how soon they may be expected to be completed."

Springfield & Illinois Southeastern.

An officer of this company writes to us under date of the 24th ult. "We will have our road complete from Edgewood to Shawneetown in two weeks, and somewhere this side of the holidays expect to have an excursion and a formal opening of the line for business,"

Atlantic & Pacific.

The track of this road which has been known until lately as the "South Pacific," was completed last week to Neosho, the county seat of Newton county, Mo., which is fifteen miles east and eight miles south of the southeast corner of Kansas, and 27 miles north of the Arkansas line. The distance from St. Louis is 311 miles. The road was to be opened for business to this point by to-day. It may reasonably expect to obtain a share of the Texas cattle traffic immediately, and when it has been extended across the Indian Territory (which it is intended to do immediately) it will form the most direct route to the East for this traffic. It will also form a new and short route for immigration to Southern Kansas, especially for all that part of the country south of the lakes. Several of the most important roads in the country will be directly interested in encouraging business in this direction.

Utah Central.

We give the rumor for what it is worth that the Central Pacific company have purchased the Utah Central road and intend forming a connection with the Kansas Pacific at Denver.

Madison & Portage.

The grading of this road is going on rapidly and the iron is being laid at the rate of three-fourths of a mile per day, having last week reached a point about eight miles from Madison, in its advance toward that city. The work will undoubtedly be completed by the middle of the present month.

Baraboo Air Line.

In the Madison *State Journal* we find an account of rapid work done on this road:

"On the 23d day of September last, the contract for grading the first and second divisions of the road extending from Madison to Lodi, a distance of 20 miles, was entered into with Messrs. Fox & Howard, of Chicago, and already, with the exception of what is known as the Asylum Rock cut, the work of grading is entirely completed, and more than two-thirds of the grading between Lodi and the Wisconsin River is also completed.

"The line of the road from this place to the Wisconsin river traverses a rolling prairie country, requiring much cutting and filling, the approximate estimate of quantities of earth to be moved being about one hundred thousand cubic yards.

"We are informed that the largest work done on the Union Pacific road on any one division, during a single month, was done on the division between Platte and Cheyenne, being 60 miles in length, under the superintendence of Gen. E. B. Pike, Division engineer, the amount of earth moved being 360,000 cubic yards. The amount of work done on the Baraboo Air Line during the month of October reached the enormous sum of 450,000 cubic yards! One fill upon the Nichols place, near Lodi, of 2,200 feet in length, embracing 109,000 cubic yards, was commenced and completed within thirty days. It must be remembered that the above has been accomplished upon a section of line of road of only 20 miles in extent, while the work above referred to upon the Pacific road extended over a line of road of 60 miles in extent, affording a greater advantage for a large estimate, as contractors will readily understand."

Albia, Knoxville & Des Moines.

The Burlington *Hawkeye* says: "The work of grading is now going forward rapidly on the first section of eleven miles, from Albia to the neighborhood of Hamilton, Marion county. If the weather is favorable it is probable that this amount of road will be completed before the new year."

Cairo & Fulton.

According to the Memphis *Avalanche* a very important arrangement has lately been made by this company with Messrs. Caldwell & Fisher, by which the contracting firm agree, within the next two years, to build the road from the Missouri line at a point very nearly south of Iron Mountain across the State of Arkansas, in a southwesterly direction, through Little Rock to Fulton, on Red River. The length of this portion of the road is about three hundred miles. Messrs. Caldwell & Fisher have, since October, 1869, had charge of the Little Rock & Fort Smith road, which is to be completed next April.

St. Louis, Chillicothe & Omaha.

The Omaha *Herald* learns through General J. H. Hammond, the President, that: "Prominent stock-"holders of the Union Pacific Company, and also of "the North Missouri, have signed a contract whereby "they have agreed that, after a certain amount of local "aid shall have been secured along the line, they, in "their individual capacity, and not as members of their "respective companies, will take the residue of the "stock, and thus insure its immediate completion to "Omaha and Council Bluffs."

Davenport & St. Paul.

A Monticello, Iowa, correspondent of the Dubuque *Times* learns that it is definitely settled that this road is to pass through Monticello in consideration of subscriptions offered. The contract for grading the 13 miles from Monticello to Wyoming, in Jones county, has been let to Mr. J. A. Bronson, of Wyoming.

About 40 miles of track is already laid from Davenport nearly to Maquoketa. Mr. L. S. House, of Delhi, has the contract for grading four miles from the Jones and Delaware county line to Hopkinton. Mr. H. A. Carter, of Hopkinton, has a two mile contract, and the work is progressing in various points in Delaware county.

Atchison & Nebraska.

The first trains passed over the railroad from Atchison to Troy, sixteen and one-half miles. The road is graded and will soon be in operation to White Cloud.

Quincy & Carthage.

This road is entirely graded and track laying commenced at Quincy last Monday, and it is thought, will be completed during the present month.

Dixon & Quincy.

The Keithsburg *Observer* says that work on the road began in that city on the 23d ult. Mr. J. B. Brown is the contractor and he has sixty teams and a large number of hands at work. This road will connect Keithsburg and New Boston and will be owned by the Chicago Burlington & Quincy Company.

MISCELLANEOUS.

—The Portland & Kennebec Railroad Company advertises that it is ready to pay the bonds given by the cities and towns on the road, twenty years ago, to help build the road.

—New Zealand proposes to construct a system of railroads with 3 feet 6 inches gauge, and the Government offers to guarantee 5 per cent. interest on $650,000 of capital invested for that purpose.

—A recent lawsuit wherein the amount originally in controversy was but $10, the plaintiff offering to pay that sum, and the defendant claiming $20, has been decided by the Supreme Court of Illinois. The plaintiff shipped goods by the defendant's transportation line, and tendered what he claimed was the lawful freight; the defendant asking more, retained the goods, which were subsequently lost by fire. The Supreme Court, in affirming the judgment for the plaintiff, thus expressed the opinion and judgment of the Court in relation to railroads and other transportation companies: "In the language of this Court, in the case of Russell *et al*, *vs.* Price, 16 Ill., 40, those associations for the transportation of goods are a great public convenience if properly and honorably conducted; while, on the other hand, their position enables them to practice a constant system of peculation, oppression, fraud, and injustice, when there is a disposition to pursue such a course, to which individuals are often inclined to submit, rather than to vindicate their rights at a cost and trouble greater than the amount suffered by the wrong perpetrated; and while it is the duty and the policy of the courts and of the law to protect these forwarders and carriers when they have acted fairly, justly, and in good faith, so, on the other hand, they cannot be too strict in visiting them with the most exemplary judgments whenever a disposition is evinced to prey upon those whom they suppose at too great a distance to protect their rights, or prefer to submit to the injustice rather than the expense of a prosecution. In the light of these remarks, appellee is entitled to commendation for instituting and prosecuting this action, and resisting an extortionate demand.—*Chicago Tribune.*

—In view of the recent decision of Justice Strong the Pennsylvania and the Reading Railroad Companies have, through their attorney, notified the Assessors of the first district of Pennsylvania that they do not recognize any authority on his part to assess, or on the part of the Collector to collect, tax on their earnings for the first half of the present year, contending that there is no law compelling them to pay it.

—In a recent case the Cheraw & Darlington Company refused to transfer certain shares of stock to Walters & Newcomer, of Baltimore, after the President had sold them, a part of the purchase money had been paid and an agreement made to deliver balance so soon as the transfer could be made. Suit being brought to compel the transfer, the Court held that there is a distinction between public and private corporations as applied to railway companies, the latter partaking sufficiently of a public character to render them subject to mandamus; that officers of such companies are bound to make transfer of stock without inquiring into the motives or purposes of either party to a sale; that the absence of all written by-laws of a company regulating the mode of transfer of stock may be supplied by the terms of the certificate of stock; that the established usage of the company would also supply the place of written by-laws and bind the company; that the transactions of a *de facto* officer of a corporation are always presumed to be regular and valid, words or acts clearly indicating an intention not to do the act required being sufficient to constitute a refusal; that where A contracts to sell stock to B and C and part only of the price is paid in cash, remainder to be paid as soon as the proper transfer on the books could be made, it is proper to join B and C with A in the application for mandamus to compel the transfer, both the buyer and the seller having a common interest in effecting a transfer; and that the approved modern rule extends the use of mandamus to cases where other remedies are not equally convenient, complete and beneficent.

—The Otis Iron Company, at Sharon, Pa., have commenced the building of a railroad bridge across the Shenango, opposite their works, for the purpose of connecting their establishments by switch with that of the Atlantic & Great Western Railroad track.

ELECTIONS AND APPOINTMENTS.

—Mr. G. B. Hubbell, late Manager of the Western Union Telegraph office at Hartford, Conn., has been appointed Superintendent of the Connecticut River Telegraph Company's lines.

—R. M. Pomeroy, of Boston, has been re-elected President, and E. H. Nichols, of New York, Treasurer of the Central Branch Union Pacific Railroad.

—The stockholders of the Pana & Louisiana Railroad Company met at Virden, Ill., Nov. 18, and elected the following Directors: O. B. Heaton, J. Plowman, J. W. Utt, J. M. Bronaugh, J. H. Henderson, N. J. Stratton, and A. Stuart, of Virden; John Chapman, of Chapman's Point; L. H. Thomas, of Montgomery county; A. Wall, and J. D. Ricks, of Christian county; L. Solomon, of Vancil's Point, and J. W. Gregory, of Whitehall. The directors chose officers as follows: Lewis Solomon, President; J. H. Henderson, Vice President; J. Plowman, Secretary; O. B. Heaton, Treasurer.

—The Atlantic, Mississippi & Ohio Railroad Company, formed by the consolidation of the Norfolk & Petersburg, the Southside, the Virginia & Tennessee, and the Virginia & Kentucky (projected) railroad companies, was organized on the 14th ult. at Lynchburg, Va., by the election of the following directors: T. J. Corprew, R. C. Taylor, J. A. Johnston, R. B. Bolling, R. C. McIlwaine, John F. Slaughter, Charles W. Statham, William Watts, Gen. J. A. Walker, Abram Falkerson and Gen. P. C. Johnson.

Gen. William Mahone, of Lynchburg, the greatest railroad man of Virginia, who planned the consolidation, was chosen President.

—At a meeting of the Iowa Pacific Railroad Company in Dubuque, on the 21st ult., Judge E. H. Williams tendered his resignation as Vice President, and George W. Mitchell was elected to succeed him. John F. Duncombe, of Fort Dodge, was also elected a member of the board.

The survey of the road to the proposed point intersection with the Davenport & St. Paul road is now being made.

—W. C. Van Horn, Superintendent of the Southern Division of the Chicago & Alton Railroad, has been appointed Division Superintendent of the Northern, Southern and Western divisions, including all the line, of the road except the Jacksonville Division.

—A change has recently been made in the directory of the Kansas City & Santa Fe Railroad. The board of directors, as now constituted, consists of the following gentlemen: Sidney Bartlett, Wm. F. Weld, J. H. Blake, H. H. Hunnewell, John W. Brooks, and John A.

Burnham, of Boston; James F. Joy, of Detroit; J. M. Walker, of Chicago; P. P. Elder, of Ottawa; J. E. Hays, of Olathe; Gen. J. W. Reid and Gen. W. H. Morgan, of Kansas City.

—A. M. Richards has been appointed General Agent of the Chicago & Alton Railroad with headquarters at East St. Louis. He will have general charge of the business of the company at Alton, and all stations south, including St. Louis.

—Under date of November 16 a circular from L. Worthington, President, announces that Nick M. Johnson has been appointed General Freight and Ticket Agent of the Cincinnati & Indianapolis Junction Railroad in place of J. A. Semple.

OLD AND NEW ROADS.

[Continued from Page 224.]

Plymouth, Kankakee & Pacific.

We are informed that the contract for building this line from Plymouth, Indiana, to Bureau Junction, Illinois, has been let to Mr. O. H. Barnes, of New York.

Missouri, Kansas & Texas.

The Sedalia branch of this road was completed last week to Fort Scott and last Monday an excursion party, consisting of many of the officers and directors of the company, passed over the new line. Regular trains will commence running next Monday from Fort Scott to St. Louis, *via* Sedalia and the Pacific Railroad of Missouri. The Osage river is crossed by a single span bridge, 150 feet in the clear, instead of by a draw as at first intended. The grading between Fort Scott and Parsons is finished and the bridging well under way. Track laying is begun both at Fort Scott and Parsons and it is expected before the close of this month to have this portion of the road, 49½ miles, ready for the cars.

Hempfield Railroad.

We learn from the Washington (Pa.) *Review* that the railroad is yet to be sold under a judgment, unless this judgment should be set aside by an injunction, which is expected. But the Supreme Court of Pennsylvania has issued a decree ordering the sale of the road to satisfy the mortgage bond holders, the chief of which is the Baltimore & Ohio Company, which holds fourteen fifteenths of the whole amount. It is reported, however, that the Pennsylvania Company will also be a bidder for the road, and, if it secures it, connect it with the Chartiers Valley road to form a line from Pittsburgh to Wheeling.

Illinois Farmers' Railroad.

A telegram from Jacksonville announces that this road was completed to Waverly, 20 miles southeast of Jacksonville, a mile of track being laid on the 30th ult. Regular passenger trains will commence running next week.

Burlington, Cedar Rapids & Minnesota.

The track on the Southern Division of this road was laid into Cedar Falls on the 30th ult. completing the connection with the Northern Division. The road is now completed from Burlington to Cedar Rapids, a distance of 100 miles.

Lake Superior & Mississippi.

The branch of this railroad from White Bear Lake, twelve miles north of St. Paul, eastward to Stillwater, on the Mississippi Kiver, a distance of twelve miles, is to be completed before Christmas.

Eel River Railroad.

Grading has been begun on this line at Columbia City, Ind., twenty miles west of Fort Wayne.

Macon & Georgia.

This railroad, which has been in progress most of the time since the war, is at last completed through to Macon, and trains are running regularly on it from Augusta to the latter place *via* Warrentown and Milledgeville. It will give Charleston a more direct connection with Macon and the railroads centering there.

Springfield & Northwestern.

The Havana (Ill.) *Clarion* says that the grading of this railroad is being pushed rapidly forward, and that it will be finished from Havana to the Sangamon River by the 10th of December.

Missouri, Iowa & Nebraska.

The Keokuk *Gate City* says of this line: "The route of this line is west from Alexandria, through the southern tier of counties in Iowa, to Nebraska City. General Drake informs us that the grading is completed to Luray, a distance of 25 miles, and that the work of track laying will commence this week. An organization known as the Iowa Railroad Contracting Company has contracted to iron the road, and the first installment of metal for that purpose has already been shipped. A speedy prosecution of the enterprise may confidently be looked forward to."

TRAFFIC AND EARNINGS.

—The receipts of the Great Western Railway of Canada, for the week ending, Nov. 4, 1870, were:

Passengers	$30,829 86
Freight and Live Stock	61,473 11
Mails and Sundries	2,073 63
Total receipts for week	$94,376 60
Corresponding week, 1869	93,113 47
Increase	$1,263 13

—The traffic receipts of the Grand Trunk of Canada for the week ending November 5 amounted to £30,300, against £34,700 in the corresponding week of last year, showing a decrease of £4,400.

—The Millers' Convention at Waterloo, on the 16th ult., was attended by seventeen mill owners. Mr. Shouffer stated the object of the convention. He urged the formation of a union for their own protection. Iowa millers were suffering through the iniquities of the commission system at Chicago and other Eastern markets, and by reason of the railroads making no distinction in freight between grain in bulk and flour in barrels. As flour is more easily handled than wheat, he contended that it would be better for producers to have wheat made into flour at home. As the manufacture of flour demands a large investment, he thought millers were entitled to a lesser rate of freight than ordinary grain-buyers. Other points he suggested, calling for concerted action on the part of millers. Another convention is to be held at Waterloo on the 11th of January, at which a large attendance is expected.

—On the 30th ult. the Union Line took from this city twenty-two cars of teas and silk from China and Japan bound for New York and London. It is said that the silk in three of these cars was worth $325,000.

—In a contribution on page 123 of the present volume of the RAILROAD GAZETTE, the number of passengers transported by the street railroads in the city of New York for the last year reported is given as "more than 130,000,000." A correspondent writes to us that there were really "more than," and a great many more than that number, the true number being about 133,000,000.

—We have from Mr. S. T. Smith, Auditor of the Kansas Pacific Railway Company, the following estimated earnings for the third week in November:

From freight:

Ordinary	$36,590 00
Government	260 00
Total	$36,850 00

From passengers:

First-class	$19,113 00
U. S. troops	417 00
U. S. mails	1,397 92
Total	$20,927 92
Total estimate	$57,777 92

REGISTER OF EARNINGS.

FOR THE THIRD WEEK IN NOVEMBER.

Michigan Central (284 miles), 1870	$91,404 10
" " (284 miles), 1869	90,847 96
Increase	$556 14
Chicago & Alton (431 miles), 1869	$128,985 74
" " (465 miles), 1870	107,612 74
Decrease (17 per cent.)	$21,373 00
Pacific of Missouri (355 miles), 1870	$76,415 00
" " (355 miles), 1869	74,677 00
Decrease (2½ per cent.)	$1,738 00

Railway Management in England.

NO. I.

Had it been possible thirty years ago for persons to become possessed of the power of second sight, it is probable that very many of the capitalists then so anxious to enlist themselves as recruits to the army of railway speculators would have repented their resolves and have sought other ways to invest their money. Of all forms of speculation—unless, perhaps, it be some branches of mining—railway construction appears that which is most often in extremes—to-day at fever heat, to-morrow cold as ice. On the whole, however, it cannot be denied that railways as a commercial scheme have been next to a failure, unless we except, perhaps, one or two portions of the metropolitan system. At the time the railway mania was at its height, dividends of 8 and 10 per cent., and even more, were confidently anticipated. Now we have the actual facts that the dividends of railways scarcely average a fourth of this—the Great Western, a short time since, dividing but 2 per cent. with 1,336 miles open; the Southeastern, 346 miles, 2¾ per cent.; the Manchester, Sheffield & Lincolnshire, 252 miles, 2 per cent.; the Brighton, 366 miles, ½ per cent.; the Great Eastern for a long period paid no dividend, and now pays about 1 per cent. on a length of 728 miles; the London, Chatham & Dover, 137 miles, no dividend whatever. The Scotch lines are as unprofitable as the English, while those in Ireland are still worse off. It is unfortunate not alone for stockholders that such a state of things should exist, but it is also bad for the public to travel by the lines, and it is bad also in that it militates seriously against the further extension of the railway system in Great Britain. We have been in the habit of saying that the railway engineer's occupation is gone; but yet, what is the fact? We find from Post Office statistics that of the total mileage of the inland mail service of the country daily little more than half of it is done by rail, the actual figures being that while the rail mileage is 49,000 that by mail carts or omnibuses is 39,000—the simple fact of the matter being that as yet the capillary system of railways is undeveloped. One source of outgo from the earnings of a line is the maintenance of the road in good condition, and any genuine improvements on existing systems of permanent way should be eagerly received by railway managers. It is to be hoped that as the manufacture of steel improves we shall some day not distant be able to manufacture reliable steel rails at a reasonable cost. The American* Government about twelve months since appointed a committee to inquire into this subject, and the said committee invited all the railway men connected with the maintenance of way to give the results of their experience. The essence of their replies tended to show somewhat limited experienee of the durability of steel rails, some having been down such a number of months or years without exhibiting any signs of wear. These reports also went to show that where great care was taken to provide against any flaw, however trifling, or any distortion, or squeezing of the rail when holding it to straighten or pare it when being manufactured, that these rails were infinitely more reliable than were those having any such defects, stating that wherever any such distortion, indentation, or flaw existed the rail almost invariably broke at that point, and very speedily too. The rail bill of a line is and must be a heavy one, but until we can get some stuff more stubborn than ordinary iron, however good, from which to manufacture rails, it must remain so. From the question of rails we naturally come to the engines which they sustain. Here, again, there is much yet to be done in the way of improvement. Could we get engines lighter than they now are, or at least with the weight more distributed, the life of a rail, whether steel or iron, would be greatly prolonged. The only way in which this weight can be distributed is by coupling the wheels, a practice that has of late years become nearly universal, though still, in consequence of the magnitude of the loads to be hauled, we have commonly from four to five tons on a single wheel; and, as some of our large lines work their coal traffic at 30 and 40 miles an hour, it needs no prophet to foretell the result to the rails.

Another source of injury to railway dividends is to be found in the multiplicity of separate managements, boards of directors, etc. At the first superficial aspect of the matter, it will be said that here the public gains the advantage from the law of competition; but searching the matter more deeply we find that almost as an invariable rule the public interests and those of any railway company are identical. Where one benefits, sooner or later the other does so too. As an example of how railway men themselves feel the force of this we may refer to a statement made by the late Captain Lows, of the Liverpool & Yorkshire Railway, who estimated the saving derivable from unity of management at as much as 20 per cent. The late Mr. Stewart, the Secretary of the London & Northwestern Railway, had stated upon examination before the Railway Commission, and upon careful examination, that the saving from unity of management was at least 10 per cent. upon the gross receipts, which he said amounted to 20 per cent. on the working expenses.

Then again, not long since, Mr. Laing, the Chairman of the London & Brighton Railway, was reported to have stated to the shareholders, that if Parliament had allowed them to amalgamate with the Southeastern Railway Company, the shareholders would have had 20s. added to their dividends, then 10s., and that would have added £1,360,000 to the value of their ordinary stock. We are not told, however, by Mr. Laing how much of this increase would have been due to the pressure brought on the public by the monopoly.

The enormous sums of money paid for land on which to make their lines has been a source of injury to railway earnings in the way of profit, and in very many cases the sums thus exacted by landowners have been neither more nor less than charges made by them for improvements effected to their own properties by the railways passing through them.

We have already more than once said that railway managers ought to turn attention to the construction of branch lines as feeders. We are well aware that branch lines so called have been made, and that they have proved to be suckers rather than feeders, but that was the case simply because they were to all intents made and worked in the same manner and at the same expense as the main lines. It would appear as though there was some moral difficulty about the working of these feeders. According to the views of some engineers it is necessary that they should be of a uniform gauge with the main line. Well, being of a similar gauge the same rolling stock travels over it. This would be no evil so long as engines specially built for the branch were put on them. It is the engines and not the trains that smash up the road; therefore, though the carriages, trucks, &c., of the main line work over the branches, so long as they are drawn by light engines, only powerful enough for branch work, a very much lighter description of permanent way will answer, and thus a considerable saving will be effected in this item. Then, again, the speed on the shorter branches not needing to be so high as on the trunk lines here would be another source of saving to the road and rolling stock also.

Could any really efficient means be devised whereby landowners deriving benefit from railways passing through their land might be compelled to pay a certain portion of the working cost of such railways it would redound alike to the advantage of all parties.—*Mechanics' Magazine.*

* Government of Massachusetts, not of the United States.—EDITOR GAZETTE

RAILROAD GAZETTE

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Editorial Announcements.

Correspondence.—We cordially invite the co-operation of the Railroad Public in affording us the material for a thorough and worthy Railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—Those who wish to make their inventions known to railroad men can have them fully described in the RAILROAD GAZETTE, *if not previously published,* FREE OF CHARGE. *They are inzited to send us drawings or models and specifications. When engravings are necessary the inventor is expected to furnish his own engravings or to pay for them.*

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Engineering and Mechanics.—Mr. M. N. Forney, Mechanical Engineer, whose office is at Room 7, No. 72 Broadway, New York, has been engaged as Associate Editor of this journal in charge of these departments. He is also authorized to act as our agent

Change in Rates.—On and after the 1st of January next, the price of subscription will be four dollars per year. Until that time, subscriptions will be received for periods not exceeding one year at the old rate—three dollars per year.

☞ *Our Prospectus and Business Notices will be found on the last page.*

THE FAST TRAINS TO NEW YORK.

One of the results of the conference of railroad managers in New York is the withdrawal of the fast trains which, on the Pennsylvania and Fort Wayne line, have made the trip to New York in twenty-seven hours, and on the North and South Shore lines, in connection with the New York Central and the Erie, have made it in thirty hours, for several months past. Our readers will remember that this train was not put on to supply any real or supposed demand for a faster train, but simply to settle certain questions at issue between the different companies. The Pennsylvania managers claimed that their trains should properly make this trip in two hours less time than those of the other lines, because the distance is shorter by 49 miles by their route *via* Philadelphia, and twelve miles shorter still by the Allentown connection (which latter, however, they have now virtually abandoned). But the other lines claimed that the heavy grades of the Pennsylvania route fully counterbalanced its advantage in length, and that no more exertion would be required to make any given time by their lines than by the Pennsylvania route. No compromise being possible, the Pennsylvania line put on a 31-hour train. The other lines then put on a 30-hour train; whereupon the Pennsylvania established a 27-hour train, the fastest yet known in America on so long a line. A time table was prepared by the other lines to meet this, but it never went into effect. It seemed to be the opinion that the Pennsylvania line would not be able to maintain its time, or that the probability of accident was so great with that time that the line would be more likely to lose than to gain reputation by it. However that may be, the Pennsylvania was left alone to "make or break" with its 27-hour train. We need not say that it "made" magnificently. For nearly six months that the train ran there was no serious accident to it, and its regularity has been remarkable. Its success has been in the face of more obstacles than those that appear on the surface—which are chiefly the Allegheny mountains. One of these is the unreasonable law of the State of Ohio which compels all trains to stop at every town of 3,000 inhabitants or more on its line in that State. So on the Fort Wayne it has twelve stops to make in that State, where otherwise it need have made but five, at most, and possibly not more than two. At the other end of the line there was another difficulty. The Camden & Amboy Railroad, which forms the New Jersey section of this line, seemed indisposed to enter the contest of speed, and its fastest train occupied three hours in making the 90 miles between New York and Philadelphia, which it might easily have made in two hours.

As the heavy grades of the Pennsylvania Railroad prohibited the highest speed on that section of the line, the saving of time here was chiefly by eliminating stops, which was done to an extent heretofore unknown in America, only two stops being made between Philadelphia and Pittsburgh, a distance of 355 miles. Still eleven hours were required for this part of the trip, and there remained 468 miles from Pittsburgh to Chicago to be made in thirteen hours. So we must give at least a full share of the credit to the Pittsburgh Fort Wayne & Chicago Railway, which has made this average speed of 36 miles per hour, including its numerous enforced stops, with great regularity.

This speed was maintained, however, only by trains eastward. The corresponding trains westward having generally ascending grades to climb made the trip from New York to Chicago in 29 hours.

We have confined our attention to the Pennsylvania line, because its train was the fastest, the other lines making the trip in both directions in thirty hours, were equally successful, and the westward train by one route, which is 982 miles long, was run at a higher speed by about 1⅓ miles per hour than the corresponding train on the Pennsylvania route, and only one mile per hour slower than its eastward train. It is quite probable that they could have made the trip in 27 hours with success; but we understand that if this had been attempted the Pennsylvania managers would at once have made the trip in 24 hours.

Doubtless the public will regret the withdrawal of the fast trains much more than they welcomed their establishment. They have become decidedly popular, and no doubt would have been much more so if they had left at a more seasonable hour. A train leaving Chicago at 5 in the afternoon and reaching New York at 9 or 10 the next evening would get all the passengers it could carry; for it would be a great gain to reach New York in time to get a night's sleep in a bed, and thus be fresh for business the next day. But while a 24-hour train is perhaps practicable, we fear that it would not be profitable, *unless an increased rate should be charged for the increased speed.* This would, it seems to us, be entirely just. It costs more to run at exceptional speeds; the time thus saved would be of great value to a large class of travelers, who would be very willing to pay for it. We hope they may sometime have the opportunity.

THE RAILROAD AMENDMENTS IN MICHIGAN.

Last June a great excitement was caused in Michigan by reason of a decision of its Supreme Court asserting the unconstitutionality of a law of that State authorizing grants of aid to railroads by municipalities. This law had been, apparently, very popular. A large number of companies had been organized and had been enabled to commence the construction of new lines by the aid received through this law. Nearly $6,000,000 had been voted to such corporations by different counties, cities and towns, and many others seemed ready and anxious to incur a debt to secure a railroad. Indeed, from the action of the people under the law, one could hardly doubt the popularity of the law. But as we have heretofore shown, such laws are almost always used largely by those who disapprove of them most, furnishing as they do facilities for operating on the fears as well as the hopes of the communities from which aid is asked.

When the decision was made, there had arisen some complications which could not, it was believed, be provided for by legislation. Various railroad companies had received bonds from municipalities and had in return constructed or partly constructed the railroads for which the bonds were given. These suddenly found the consideration which they had received declared absolutely valueless, which the municipalities not only could not be compelled to pay, but were absolutely forbidden to pay by the highest judicial authority of the State. Worse than this, in many cases the companies had disposed of these bonds to third parties. These had nothing to show for their money but the worthless paper; the railroad companies had at least the roads which they had constructed.

It was believed that a constitutional amendment might be made which would enable the municipalities to pay the bonds, which by this decision they could not pay, however much disposed so to do; it was also the hope of many that other amendments would again give power to the municipalities to vote aid. The Governor was prevailed upon to call an extra session of the Legislature. At this session an opposition to the principle of voting aid was developed. Propositions to that effect were urged very persistently, but none could secure the requisite two-thirds majority. It was urged that it was necessary to give authority to pay the indebtedness already incurred in order to preserve the credit of the State, which had been for many years unimpeached. But the disposition was towards restricting rather than favoring railroad corporations, and the amendments proposed, which were to form Article 19 of the constitution, were as follows, sections 1 and 2 borrowed from the new constitution of Illinois, and section 3 providing in an indirect manner for the payment of the bonds declared illegal by the Supreme Court:

"ARTICLE 19, SEC. 1. The Legislature may, from time to time pass laws establishing reasonable minimum rates of charges for the transportation of passengers and freight on the different railroads in the State, and shall prohibit running contracts between such railroad companies, whereby discrimination is made in favor of other companies owning connecting or intersecting lines of railroad.

"SEC. 2. No railroad corporation shall consolidate its stock, property or franchise with any other railroad corporation owning a parallel or competing line, and in no case shall any consolidation take place except upon public notice given of at least six days to all stockholders, in such manner as shall be provided by law.

"SEC. 3. The Legislature may provide by law for the payment by the counties, townships and municipalities of this State, of all bonds or other obligations heretofore issued or incurred in pursuance of acts of the Legislature, by such counties, townships and municipalities severally, for and in aid of any railroad company. Such bonds, or obligations, shall be paid by the county, township or municipality issuing or incurring the same, and in no event shall the State pay, or become liable for, any portion of such bonds or obligations. The Legislature shall submit to the electors of each of said several counties, townships and municipalities, for their decision, the question of payment, together with the mode and manner of the same."

These amendments were submitted at the election on the 8th ult. The result indicates that if the railroad aid law was ever popular there has been a very decided revulsion of opinion concerning it. While the two sections imposing restrictions on railroad companies were adopted, the third section, which would have merely authorized the Legislature to authorize municipalities to pay the debts they had already incurred to railroad companies, *if a majority of the municipality should vote in favor of so doing*, was defeated by a large majority! This seems hardly credible, and certainly not creditable, for whatever objections there may be to authorizing municipal debts in aid of railroads, there are many reasons, economical as well as moral, why those which have once incurred such debts should be permitted, not to say encouraged, to pay them. At present it looks as if the good people of Michigan were glad to take advantage of their own mistake to escape the payment of an honest debt.

It is understood that some of the sufferers of the decision in this State will carry their case to the United States Supreme Court, whose decision will be looked for with much interest.

—The railroad commissioners, as referees between the Maine Central and the Belfast & Moosehead Lake railroads, in the matter of the lease of the latter, have rendered a decision in favor of the Belfast road, awarding that the road was ready on the first of November, according to the requirements of the contract; that it is a first-class road, such as the contract calls for, and in a fit condition to be opened during the winter and spring. The also decide that the corporation have until July next in which to complete minor details by the terms of the contract. The commissioners also regulate the running of trains if questions arise in consequence of a further refusal on the part of the Maine Central road.

—The Secretary of the Treasury announces that the payment of warrants to the Pacific railroad, which, it has been said, he will not pay until they pay up the accrued interest on the government bonds with which they were subsidized, is delayed until the opinion of the Attorney General can be obtained. If he does not sustain Mr. Boutwell the warrant will be paid.

Among the Railroad Shops.

PITTSBURGH, FORT WAYNE & CHICAGO—FORT WAYNE SHOPS.

A trip from Chicago to Fort Wayne and return is a very good illustration of the present state of "development" of the means of travel in the West. In order to visit the railroad shops and do it with as little consumption of time as possible, we selected the train which then left Chicago at 5:25 p. m., which is after business hours, and, as it reaches Fort Wayne at 11:35, the night's rest is not seriously interfered with. We have learned from doleful experience that to encroach on the hours of sleep, excepting in cases of extraordinary emergency, is always a waste of time. On a long through journey, when the traveler can avail himself of a good sleeping car, he can get a tolerable night's rest and not feel the effects seriously the next day. But not to relax the muscles or brain with sleep is to cheat them of their due, for which they are sure to take revenge.

At the Fort Wayne depot the train, as usual, was guarded by brakemen, those sentinels whose pass-word is woman, without which no bachelor is allowed to enter the best car. We bowed our head meekly to them as our habit is when we reflect bitterly on the unblessed state of our lot, and passed on into the "car ahead," which is usually a temple baptized with tobacco juice. In this instance it was comfortable enough, but the usual American rite to which which we have referred was being administered with great vigor. We found the car had Dripps' stove and system of warming and ventilation, of which we expect to give a full description and illustration in a future number. Soon after leaving Chicago some one complained, and justly, to the brakeman that the car was too cold. This he seemed to resent, and remarked as he closed the ventilators that *he* would make it hot enough, a threat which his action seemed to indicate would be carried into execution, and "more too." We protested against the exclusion of fresh air, or rather the inclusion—if there is such a word—of the foul air. He and an American citizen of African descent, a vender of apples and confections, raised such a clamor against our protest that we subsided. As the stove grew hotter, however, we went to the back end of the car and made some inquiries of the brakeman in regard to the arrangements for warming, and, finding him a bright, rather wide-awake youth, we delivered a short extempore lecture on ventilation, the result of which was that he opened the apertures which he had closed, and the passengers breathed pure air through the rest of the journey.

The train arrived at Fort Wayne promptly on time. On inquiry at the hotel we found that the fast train left for Chicago at 12:25 p. m. the next day. We therefore gave directions to be called early in order that we might accomplish what we came for and return to Chicago by that train.

A walk of half a mile the next morning, through a sharp, frosty atmosphere, brought us to the shops of the Fort Wayne road. They have obviously been erected to last, not for a lifetime only, but to accomplish as far as possible the purposes which the presumed immortality of such a corporation will require. They are all substantially built of brick and supplied with excellent machinery.

Mr. Boon, the Master Mechanic, is building one new freight, one passenger and one switching locomotive. The freight and passenger engines are of the usual plan, with four driving wheels and a truck. The cylinders of the former are horizontal, 16 in. in diameter and 24 in. stroke. The wheels are 62 in. in diameter and spread 7 ft. 9 in. from centre to centre. The tires are put on with Griggs' wooden bearing blocks, which are said to give very good results in the wear of the tires of this road. The fire-box is 58⅛ in. long inside, and the boiler has 142 2-in. tubes. The boiler is 46¼ in. diameter next the smoke-box and made telescopic with a "wagon top" 7¼ in. high; and one dome of 28 in. diameter. A mud drum 16 in. in diameter and 12 in. deep is placed underneath the boiler behind the smoke box. The horizontal seams are all double riveted. In some of the seams on the fire box we noticed the rivets were spaced 2¾ in. from centre to centre in the same row, and the rows were 1⅛ in. apart. In the barrel of the boilers the rivets are 1¾ in. from centre to centre in the same row, and the rows 1¾ in. apart. In both cases the rivets are ⅝ in. in diameter and placed zig-zag. All the horizontal seams are located above the water line.

The steam ports are 16 in. long and 1¼ in. wide; the exhaust ports 2¼ in. wide. The valves have 5¼ in. travel, ⅜ in. lap outside, and are "line and line" inside.

All the braces attached to the boiler are put on as nearly vertical as possible, so that the expansion of the latter will not move the frames or other parts of the machinery. The slides are placed far enough above the centre of the piston rod to admit of a separate steel wrist pin being put into the cross-head for the connecting-rod bearing.

The engine is supplied with two pumps. The piston packing is formed of one solid cast-iron ring, slipped on the spider. This ring has two grooves turned into it each about a half inch square. A cast-iron ring is sprung into each one. The rings are turned a little eccentric and cut at the thinnest part. Mr. Boon informed us that the cost of a pair of these pistons is $34.00 less than a pair with ordinary spring packing, and that they show much less wear and are otherwise more satisfactory.

The throttle lever of this engine is very neat. It has a latch and quadrant similar to those used on reverse levers. The teeth in the quadrant are of the shape of saw teeth with their vertical edge placed next the boiler. Any pressure against the throttle lever will close the valve, but it can never be opened without disengaging the latch.

The truck wheels are spread 5 ft. 8 in. For passenger engines Mr. Boon uses inside and outside bearings on the truck axles. This, he says, effectually obviates all trouble from hot boxes.

The switching engine has four 48-in. wheels spread 7 ft. The cylinders are horizontal, 14x22 in.; steam ports 1⅝x13 in. There are two guides on each side, one over the other, with the cross-head between. The boiler is 39 in. in diameter, with a wagon-top raised 6 in., and has 83 2-in. tubes. The fire-box is 46 in. long. The boiler has a mud drum located in the same position, and of the same size as that on the freight engine. The supply of water and fuel is carried on an eight-wheeled tender, and the boiler is fed by an injector.

We observed that Mr. Boon has all the brasses for driving boxes made octagonal, where they fit into the cast iron housings. Both the cast iron and brass castings are planed and carefully fitted to each other. Our attention was especially attracted to this, because we have found that there is considerable diversity of opinion with reference to the proper form for brasses. At some other shops the master mechanics are just as strong in advocating a semi-circular form. It may seem perhaps a very fine point to make, but any one who has run an engine, and knows the annoyance caused by the thump resulting from a loose brass, will realize the importance of what we are discussing, if, as we are told by some, the semi-circular brasses work loose, and by others that the octagonal ones cannot be kept tight. Which is it, gentlemen? We hope the octagon men and the semi-circular advocates will come forth and discuss the question in the RAILROAD GAZETTE.

Mr. Boon's practice in fitting up pumps has also disturbed our previous opinions and convictions. We believe it is the almost universal practice to give the upper valves more lift than the lower, and the check more than either. This practice is just reversed in the Fort Wayne shops. The bottom valves have 5-16 in. lift, the top ¼, and the check 3-16. Experience on that road, Mr. Boon says, has convinced him that pumps work better when arranged in that way than they do on the old plan. What say ye, master mechanics and locomotive runners? Tell us what you know on the subject. We hold our own opinions subject to be changed by the light of knowledge and experience.

The tool room of the Fort Wayne shop is worthy of special mention, and also the fact that it and the store-room are in charge of a woman. This was so unusual that we made special inquiry how it came about. We learned that the former store-keeper was taken sick, and in order that he might not lose his place his wife volunteered to fill the position during his illness. The duties were so well performed by her that after his recovery she was allowed to hold the position and he was appointed time-keeper. She has won the confidence of the employers and the esteem of the employed, and Mr. Boon informed us that any misconduct to her would be promptly resented by the men. We trust they will tie to a stake the first man who is guilty of any impropriety in that direction, and then—not build a fire around him, but—turn the hose pipe of their steam fire pump on him. That would be better than "punching his head," and we do not believe it is punishable by law.

The pump referred to was not built for the purpose of inculcating proper respect for women, but was put up for protection against fire. It has a steam cylinder of 12 in. diameter, 8 in. stroke and a water cylinder of 4 in. diameter and 8 in. stroke. With it there is a coil of 2,000 ft. of hose ready for use at any moment.

All the springs made in their shops are tested under a machine consisting of a powerful lever and weight. Sufficient pressure is put on each spring to bring it down straight, and if it resumes its original shape it is pronounced all right, but if it retains any set after the weight is removed, it is condemned.

In the car shops, which are also under the jurisdiction of Mr. Boon, four new passenger and two new Pullman sleeping cars are being built. The former are 50 ft. long over the body and 10 ft. wide, and are to have Dripps' heater and ventilator. The Pullman cars are 52 ft. long and 10 ft. wide. There is nothing peculiar about them, and they are in no way different from those built heretofore, excepting in the color, which we hardly know how to describe. If dark greenish brown will convey any idea, they are that, or we might say the color of crude unrefined coal-oil. It is almost the hue which a car will get when exposed to coal smoke and cinders, and therefore the best for a railroad car.

We also visited the

TOLEDO, WABASH & WESTERN RAILROAD SHOPS

at Fort Wayne. Mr. Ray, the Master Mechanic, has just put up a new 2,000 lb. steam hammer, built by Bement & Dougherty of Philadelphia. The object in getting the hammer was to work up their scrap iron.

Mr. Ray is also building four new four-wheeled switching engines, with separate tenders for carrying fuel and water. They (the engines) are to have 13x22 in. cylinders. He has also several boilers for new freight engines, but we could not learn their dimensions. We observed that the horizontal seams of all these boilers were made with a covering plate inside, a plan we wonder has not come into more general use.

After finishing our visit to Mr. Ray, we found there was just time enough to catch the fast train at 12:25 p. m., which we took and reached Chicago at just about the time we left it the day before, having traveled 296 miles, taken a comfortable night's rest, got all the information we have embodied in these notes and much more besides, all inside of 24 hours, which as we said in the commencement is an illustration of the condition of railroad travel in this Western country at the present time.

MILWAUKEE & ST. PAUL RAILROAD SHOPS AT MILWAUKEE.

Mr. T. S. Davis was appointed a few months ago, and is now filling the position of Superintendent of Motive Power of all the consolidated Milwaukee & St. Paul roads. All the locomotives and their repair shops come under his supervision. Each of the latter is under the special charge of a master mechanic, who comes under the jurisdiction of Mr. Davis. The car shops have each a master car builder. They are independent of each other and of the department of motive power.

In Milwaukee there are two distinct establishments, which are located about two miles apart and known, the one as the "Milwaukee Shops," and the other as the "North Milwaukee Shops." Of the former Mr. E. Fairbairn is Master Mechanic, and Mr. John Baillie, Master Car Builder, and of the latter, Mr. James Lowrey is Master Mechanic, and Wm. E. Kettridge Car Builder.

Nearly all the new work is done at the latter shops. They have now two new freight engines in process of construction, of the ordinary plan, with 16x24 in. cylinders. The boilers are 45 in. in diameter outside of small sheet, and have 137 2 in. copper tubes. The iron in barrel of boiler is 5-16 in. thick, and the outside shell of furnace ⅝ in. All the seams are single riveted with ¾ in. rivets, spaced 2¼ in. from center to center. The boiler has a straight top with two domes. We believe the second engine is to have only one dome. The driving wheels are 62 in. in diameter, spread 7 ft. 6 in. from center to center. The steam-ports are 1⅝x15 in. the exhaust 2¾ in. wide. The greatest travel of valve is 4 1-16 in., the throw of eccentrics 4¼ in. The difference between the two is owing to the unequal length of the rocker arms. The lap of valves outside is 13-16 in., and inside 1-16 in.

The guides are made of wrought iron, case hardened. The cross-heads are 16 in. long, with glass bearings. The truck has a lateral swing motion. An eccentric ring is fitted into the centre plate, by which the lateral position of the centre casting attached to the engine can be adjusted.

The engines are intended for burning wood, and will have a very plain finish. We find there is now a general tendency among nearly all railroad managers to discard the absurd ornament on engines so common a few years ago.

Among the engines of the St. Paul roads we noticed several with Tremain's piston valves. The construction could not be examined, as none of the covers were off. Seven of their locomotives have these valves. We did not learn very definitely with what success they worked, but observed that the new engines were being built with the ordinary slide valves.

A number of the the tools in use in the shop have been of "home manufacture." Among them a steam hammer, similar to the well known "Davy hammer," and a punch and shear. The tools are most of them from Bement & Dougherty's and Seller's shops, and are consequently the best of their kind. In nearly all the shops we have visited lately, we have observed that neat tool rooms have been fitted up, and that some system of checks, or of charging the tools to the persons who take them away, is in vogue. The North Milwaukee shops are not behind in this particular. They have a small but well kept room devoted to this purpose, and in charge of a person whose duty it is to give special heed to this department. No person without experience would credit the losses to a railroad company from this source, if due care is not given to it; taps and dies, reamers and drills disappear in the most mysterious ways and must be replaced at much expense. When, however, the user is held personally responsible, he is apt to look out somewhat more sharply to the safe return of the tools than he would if it was no one's business.

In the car department of the North Milwaukee shops they have 50 new freight cars to build during the winter. They are using Benedict's springs, which are certainly the simplest steel springs we have ever seen. In case of the breakage of one plate, it can be taken out and replaced without spoiling the whole spring. The cars are 27 ft. long on the body, 8 ft. 6 in. wide and 6 ft. 10 in. high from centre to top of roof.

Mr. Kettridge is about to give special attention to and go into a careful investigation of the weight of cars. He intends to weigh every part of all the different patterns of cars they have, and make a careful comparison of their weights, one with another. A pair of the trucks intended for the new freight cars he found weighed 9,363 lb. We expect to get more figures of the same kind from him after he has carried his investigations further, and hope to receive similar data from other sources.

A new snow plow has just been completed at these shops, and is ready for the first storm. It is attached to a covered car, and is arranged so that the point of the plow can be raised or lowered without moving the other parts. By this means its height can be regulated with greater ease, and the part which is fixed can be more securely braced to the car than is possible when the whole plow is movable.

Mr. Kettridge and his men have four new passenger cars in progress. They are to seat 56 passengers, are 48 ft. long over the body, 10 ft. wide, and will have four wheeled trucks. In considering the question of reducing the weight, Mr. K. very properly takes the ground, that no reduction of weight which will make the lives of passengers less secure should be for a moment entertained. At the same time, he recognizes what every thoughtful mechanic must, that much of the weight carried does not add at all to the security of life, or even to the comfort of travelers. He and his co-laborer, Mr. J. G. Fischer, in order to give greater security to their cars and also to lessen the danger to brakemen in coupling, have designed a platform and coupler of which we will give an illustration and full description in an early number.

They have also one mail and express car and two baggage cars on the track. They all have raised roofs the same as their passenger cars. The mail and express car has two com-

partments, with a small door between them, and has doors at each end. The cars for baggage are of the same size as those for passengers. They are all painted a dark yellow, made of white lead and "golden stone ochre" and striped very plainly. The rafters for passenger cars are bowed up so as to reach to the top of the raised roof, are made of iron and cased with wood on the outside. We do not know exactly what good purpose the wood serves, and are disposed to think that there is no reason for being ashamed of having made car rafters of iron, and therefore, it seems unnecessary to try to make the public believe they are made of wood. We wish every car builder in the country would paint on a board and hang up in his shop Ruskin's maxim, "ORNAMENT YOUR CONSTRUCTION, BUT DO NOT CONSTRUCT YOUR ORNAMENT." It would probably have a marked effect in reducing dead weight of cars.

Nearly all the new work for the St. Paul road is done at the North Milwaukee shops. The shops under the charge of Mr. Fairbairn and Mr. Baillie were all burned out last March and have just fairly recovered from the effects of the fire. They are located more conveniently for doing repairs than the other shops, and are therefore kept busy at that kind of work.

We found Mr. Fairbairn in the store-house, where he called our attention to the brass castings which they were using. They are all made as light as possible, and yet retain sufficient strength. He had carefully gone through all the patterns and reduced the weight wherever it was practicable. The same thing could be done in most other railroad shops to advantage. Mr. Fairbairn has fitted up a very neat tool room, but it is too small for his needs. A little outlay here would be economy. The tools are many of them new, and were built by Bement & Dougherty.

We were shown a plan of trueing up guides which was new to us. On the tool holder of an ordinary planing machine, a fast-running, solid emery wheel about 8 or 10 in. in diameter is attached, and driven by a belt from a counter shaft overhead. The guides are then bolted to the bed of the planer—after they are hardened—and run backwards and forwards under the emery wheel. The latter of course runs very fast at the same time, and is also fed laterally by the feed motion of the planer. The guides are thus made perfectly true and smooth. When slightly cut by the cross-head, they can be "trued up" in this way without annealing them. Crank pins are also trued up in the same way after being case-hardened. It is known to all experienced mechanics that any piece of steel or iron, if heated hot enough to harden, will "spring" somewhat out of its true form. Any surface intended for a frictional bearing should of course be as nearly absolutely "true" as human art can make it. In trueing crank pins they are of course put into a lathe instead of a planer. The emery wheel is put on the tool-holder the same as the planer; the wheel and pin revolve in opposite directions, the one of course very fast and the other slowly. The results in wearing have been very satisfactory, and pins finished in this way are not nearly so liable to heat and cut as those which are not "lapped off."

Some of the connecting rods of the engines we noticed were painted between the stub-ends instead of being finished and polished. We recommend the practice for universal adoption. There may perhaps be some inscrutable reason for spending several days' time and ten to twenty or thirty dollars in finishing rods between the two ends, but we have never been able to know what it is. Have the forging done as neatly as your blacksmiths are capable of doing it, then finish the two ends and paint the space between with a little very narrow and very plain striping. Watch your painter carefully, or he will allow his brush to go into hysterics here.

Fig 1.

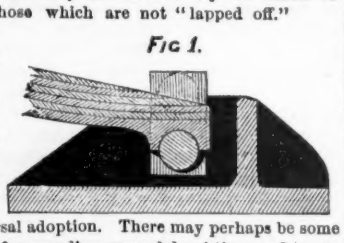
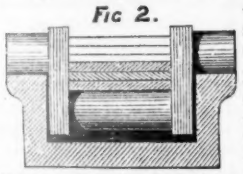


Fig 2.



Talking of painting reminds us that some of the tenders we saw here were painted very neatly. Plain, but—etc. The body was a dark wine color, and the striping ran straight all around. The main stripe was green, 1¼ in broad; on each side was a yellow stripe, each ⅛ in. wide, and two inches from these was a bright red stripe 1-16 in. wide. The effect was good and it was as cheap as paint can be.

The tender springs are hung in a sort of hanger at each end, an illustration of which we give below, drawn to a scale of 1-6. Ordinarily when a spring rests on a cast-iron plate, the friction is so great that it seriously interferes with the elasticity of the former, and in a little while it is apt to cut a sort of pocket in the iron, which of course makes it still more difficult for the spring to move. A steel plate is sometimes put under the spring at this point, but it is only a mitigation and not a cure of the evil. Figure 1 represents a longitudinal, and Figure 2 a transverse section of the end of the spring and hanger. No explanation is needed. The hanger is forged in one piece and the bearings turned. The lip in the bottom plates should extend at least half way around the bearing. We have drawn them larger than they were on the spring we examined.

Mr. Davis is using rye in the boiler of his locomotive to loosen the scale, and with good results. The remedy is simple and easily tried. We suppose it ought to be of the last crop, because "old rye" often produces *foaming*.

Chicago Railroad News.

Freights Westward.

The New York Central & Hudson River, Erie, Pennsylvania, and all connecting railroads agreed last week to an advance in western-bound freights which took effect Monday the 28th inst. The following are the rates decided upon: To Columbus—First-class, $1.27; second-class, $1.03; third-class, 81 cents; fourth-class, 51 cents. Cincinnati—First-class, $1.46; second-class, $1.18; third-class, 93 cents; fourth-class 59 cents. Louisville—First-class, $1.75; second-class, $1.45; third-class, $1.14; fourth-class, 74 cents. Chicago—First-class, $1.60; second-class, $1.30; third-class, $1.00; fourth-class, 65 cents. St. Louis—First-class, $2.00; second-class, $1.63; third-class, $1.29; fourth-class, 84 cents. The fifth or special class is abolished.

Chicago & Alton.

The *Commercial and Financial Chronicle*, in an article on railroad earnings which we copied last week, made an error in reporting those of the Chicago & Alton. It credits the earnings of October, 1869, to the same month in 1870, and *vice versa*, and thus shows a decrease of $20,446, when there was really an increase of that amount. This also vitiates its comparison of this road for the ten months of the year ending with October. It gives the increase in 1870 as only $33,-025, whereas it was really $73,797.

Trains are now running regularly through to Washington on the new branch. This will be extended no further this season, but its branch to Lacon is progressing and will soon be completed.

As we note elsewhere, Mr. W. C. Van Horn, for some time Division Superintendent of the Southern Division, on the 28th ult. was appointed Division Superintendent of the Northern, Southern and Western Divisions—embracing all the road except the Jacksonville Division. His headquarters will be at Chicago. Another appointment is that of Mr. A. M. Richards to the new office of "General Agent," with general charge of the company's business at Alton and all stations south, including St. Louis. The contest for business at St. Louis is now very warm, as the numerous lines from that place to New York work hard to prevent any business from going to the East *via* Chicago.

Chicago & Northwestern.

We announced last week the changes in the running time made on the Galena Division on the 21st ult. Last Sunday changes were made on the other divisions as follows: On the Wisconsin Division the night express leaves at 6:00 p. m. instead of 5:00 p. m., and the Woodstock accommodation leaves at 5:00 p. m. instead of 5:30. On the Milwaukee Division, the Milwaukee mail leaves at 8:15 a. m. instead of 8:00; the Evanston accommodation at 1:00 and 6:15 p. m. instead of 11:40 a. m. and 1:30 p. m.; the Kenosha accommodation at 4:10 p. m. instead of 4:15; the Waukegan passenger at 5:00 p. m. instead of 6:15; the afternoon express at 5:45 instead of 5:00.

The company have definitely located their

BARABOO AIR LINE

the remainder of the distance from Reedsburg to La Crosse. Between Madison and Reedsburg the road is under contract, and is rapidly building. Starting from Madison, this part of the line passes through Lester, Dane, Lodi, Merrimac, Baraboo, Ableman and Reedsburg. The newly located line from here passes through Lavalle, Wonowoc, Union Center, Tripps, Roberts, Ontario, Brush Creek, Summit, Hall's Valley, Leon, Bangor and Salem to La Crosse. Bangor and Salem are also stations on the Milwaukee & St. Paul road.

WINONA EASTERN CONNECTION.

This line, which is to be a continuation, or rather a branch of the Northwestern's line from Madison to La Crosse, is now entirely graded and all the iron down with the exception of the middle eight miles. The tracklayers are still at their posts, but the work is temporarily suspended until the necessary iron arrives.

Illinois Central.

On Monday next this company will commence running trains through between Cairo and St. Louis by way of the new Belleville & Southern Illinois Railroad from St. Louis to DuQuoin, 70 miles, and from DuQuoin to Cairo, 76 miles, over its own road. This forms a line from Cairo to St. Louis only 146 miles long, and quite direct. By it the distance from St. Louis to Columbus will be 32 miles shorter and the time two hours less than by the Iron Mountain Railroad, which is now making great efforts to secure both the passenger and freight business from St. Louis southward. The new line is called the "St. Louis & Cairo Short Line." It will be equipped with first-class rolling stock and present excellent attractions for southern business.

The Illinois Central's facilities for Southern business are likely to be much improved soon by the extension of the Mobile & Ohio Railroad to Cairo. Engineers are now examining the route, and we are informed that there is little doubt that the extension will soon be made. The route from Cairo will be a little to the east of the Mississippi, and the junction with the old road will probably be made, not at Cairo, but at a point eight or ten miles further south which, however, will be little if any further from Cairo.

The Mobile & Ohio also will make an arrangement with the new road lately opened between Mobile and New Orleans, by which trains will soon run through between New Orleans and Columbus by way of Mobile. This route is a little longer than that by the Mississippi Central, but it will be operated expressly to connect with the Northern lines, and not to accommodate the Louisville and eastern business.

A week from next Sunday a change of time and of trains will be made on the Iowa Division. After that time a passenger train will run regularly through between Dubuque and Sioux City. Heretofore the passenger train ran only as far west as Fort Dodge, and thence westward passengers have been carried by a mixed train.

A change of time will be made Sunday, by which trains will leave as follows; the day express at 9:20 a. m., instead af 9:30 as heretofore; the night express at 8:15 p. m. instead of 8:30 as heretofore; the night express at 8:15 p. m. instead of 8:30. Both of these will have cars for Keokuk, St. Louis and Cairo. The Champaign passenger will leave as before at 4:55 p. m.

The day express will arrive at 8:15 p. m., the night express at 7:00 a. m., and the Champaign passenger at 9:30 a. m.

Chicago, Burlington & Quincy.

This company is now running trains in connection with its Carthage & Burlington Branch on the New Carthage & Quincy Railroad as far south as Mendon, 25 miles south of Carthage. Tracklaying is now progressing at both ends of this road, and it will soon be completed. The road also gains a new connection in the new Chicago & Iowa Railroad, which is now completed from Aurora about 10 miles due west, into Squaw Grove.

A change of time went into effect on this road on Sunday last. By it trains leave and arrive as follows:

Leave.	Arrive.
7:00 a. m. Riverside and Hinsdale	9:18 a. m.
7:50 a. m. Mail	3:40 p. m.
10:45 a. m. Pacific Fast Line	4:15 a. m.
1:30 p. m. Riverside and Hinsdale	5:30 p. m.
3:00 p. m. Galesburg Passenger	8:10 p. m.
4:15 p. m. Mendota Passenger	9:45 a. m.
5:30 p. m. Aurora Passenger	8:30 a. m.
6:15 p. m. Riverside and Hinsdale	6:50 a. m.
9:00 p. m. Pacific Night Express (daily)	7:30 a. m.

The fast express leaving at 10:45 a. m. has sleeping cars attached which run through from Chicago both to Council Bluffs and to Kansaas City. The through car to Denver is attached to night express, leaving at 9 p. m., saving the traveler four hours. The chief change is in this train which has heretofore left at 11:30 p. m. The old evening express becomes the Galesburg passenger, and leaves at 3 instead of 5 p. m, Returning, it is not strictly a Galesburg passenger, but brings in cars from Burlington and Quincy. The other trains remain as heretofore.

The success of the through car to Denver, which was put on this road only a short time ago, is worthy of remark. Tuesday every berth in it was taken, and every passenger except one, who went only to Kansas City, was ticketed through to Denver. This would indicate that the Kansas Pacific, as well as the Chicago, Burlington & Quincy, has become a favorite route.

Lake Shore & Michigan Southern.

The business of this road continues to be good, comparing favorably with corresponding periods in previous years. Mr. Devereux, the General Manager, has not yet established his headquarters in this city, as was incorrectly announced some weeks since, though he will probably eventually do so. He is at present in New York, as is also Mr. Phillips, the late General Manager at Chicago. The following time table changes will take effect to-morrow: The mail train, over both the old road and the air line, will leave at 5:30 a. m., instead of 7:30, and arrive in Cleveland at 9:35 p. m.; the special New York express will leave at 9 a. m., instead of 11:30, and arrive in New York at 7 o'clock the next afternoon. There is no change in the leaving time of the Atlantic express, 5:15 p. m., though it arrives in New York thirty-five later than formerly. The night express also leaves on the old time, 9 p. m., and arrives in New York at noon of the second day.

Chicago Colorado Colony.

The National Land Company, and incidentally the Kansas and the Denver Pacific Railroad companies, whose land the National sells, is likely to be materially benefited by the establishment of the above colony, the first steps toward which were taken in this city on the 22d ult. The colony proposes to send a locating committee to Colorado to select a suitable tract of land large enough to supply all who shall become members of the colony. These will be surveyed, a town located, and then divided among the colonists, very much as was done at Greeley.

Persons of good moral character, and strictly temperate habits, can be made members by paying or enrolling their names, $5 each, and before the 15th of January $150 each. The officers of the preliminary organization are Rev. Robert Collyer, President; Sidney Howard Gay, Vice President; Hon. William Bross, Treasurer; C. N. Pratt (General Agent of the National Land Company), Secretary; and George S. Bowen, S. D. Kimbark and Henry D. Emery, Executive Committee. All these are well known as prominent and responsible men in this community.

Personal.

Mr. Walter Katte, who has been for some years agent and engineer of the Keystone Bridge Company in this city, was married on the 22d ult., to Miss Lizzie P. Britton, eldest daughter of James H. Britton, Esq., of St. Louis.

Winter Time Table of the New York Lines.

As we announced last week, a change of time agreed upon by the three lines between Chicago and New York goes into

effect Sunday, December 4. The only change in the times of leaving will be in the fast express which has heretofore left by the Fort Wayne route at 11 a. m., and by the Michigan Southern and the Michigan Central half an hour later. This train hereafter will leave on all the lines at 9 a. m. It will no longer be the fast train, making the time to New York in, we believe, about 36 hours. The Atlantic express will leave as heretofore at 5:15 p. m., and the night express at 9 p. m.

NEW PUBLICATIONS.

The Young Pilot, for December, is the first number of an original monthly magazine, "designed," as is announced in its prospectus, "to interest and instruct young people who "have entered their teens, and who feel the need of more "solid reading matter than is usually obtained in the juvenile periodicals of the day." Having thus limited their literary work, its editors have devoted themselves to it with consistency and excellent judgement. This first number contains thirty-two pages of entertaining stories, sketches and essays which are apparently nicely adjusted to lead and instruct the minds to which it is addressed and cultivate their tastes as well as cater to them. The magazine is entirely original and is supported by an unusually large corps of contributors. The typography shows such care and skill as will appear particularly commendable to those who have had experience in issuing the first number of any publication. The subscription price is one dollar a year and the address is Young Pilot Publishing Company, Chicago, Ill.

East Tennessee, Virginia & Georgia Railroad Report for the Year Ending June 30, 1870.

The East Tennessee, Virginia & Georgia Railroad is formed by the consolidation of the East Tennessee & Virginia Railroad, extending from Bristol (State Line) to Knoxville, Tenn., 130 miles, and the East Tennessee & Georgia Railroad from Knoxville, Tenn., to Dalton, Ga., 112 miles—making, with the Branch from Cleveland, Tenn., to Dalton, Ga., (28 miles,) a total length of 270 miles. The consolidation of these companies was effected by a unanimous vote of the shareholders on the 29th of November, 1869; but as the fiscal year of the company terminated on the 30th of June, it was thought advisable to condense and give the consolidated earnings of the two properties, commencing on the 1st day of July, 1869, and ending on the 30th day of June, 1870. Adopting that system of reporting, the gross earnings of the past compared with those of the preceding year were as follows:

	1869.	1870.
From passengers	$421,526 86	$508,108 36
" freight	548,972 34	696,452 99
" express	23,434 78	26,484 51
" mail	29,190 63	33,535 51
" other sources	30,607 29	14,282 43
	$1,053,731 90	$1,278,863 80

The total expenses for the year ending June 30, 1870, were as follows:

Repairs of road	$229,914 08	
Motive power	187,959 45	
Maintenance of cars	104,324 85	
Transportation	149,396 31	
Wood account	49,964 21	
Salaries	20,171 63	
U. S. internal revenue	12,496 13	
Great Southern mail route	11,191 19	
Law expenses	11,925 55	
Va. & Tenn. Air Line	8,778 24	
Agents' expense account	5,023 00	
Revenue and postage stamps	339 00	
Taxes	108 44	
London bridge	754 77	
Depot buildings	717 42	
		863,064 27
Leaving a balance of		$415,799 53

Of the expenditures $146,882.15 are reckoned for permanent improvements, leaving the ordinary expenses $716,182.12.

We give below a summary of the report of Joseph Jaques, the Vice-President, who reports instead of Mr. Callaway, deceased.

The indebtedness of the line to the State of Tennessee at the time of consolidation was $4,117,761.10. The State of Tennessee having authorized railroad companies to pay their debts to it in its bonds and overdue coupons at par, this company has availed itself of this privilege, purchasing the State bonds at 55. To obtain money for this purpose first mortgage 7 per cent. bonds were issued, which are still in the market at 82, and at this rate more than a million of dollars will be saved to the company.

During the year the Selma, Rome & Dalton Railroad completed its connection with this road at Dalton, completing a new and more direct route to Alabama, Mobile, New Orleans and the Southwest. The Alabama & Chattanooga, soon to be completed to Meridian, will form still another route, which will add to the business of the East Tennessee, Virginia and Georgia line.

Mr. Jaques advises that two trains daily be run on the line hereafter, connecting with both of the above roads. He hopes to obtain important advantages from the construction of the Knoxville & Kentucky Railroad, intended to connect with Cincinnati and Louisville, and from the Knoxville & Charleston, 16 miles of which is completed, which will connect with South Carolina and the sea coast; also from the Cincinnati, Cumberland Gap & Charleston road, 40 miles of which, from Morristown on this road southeast of Wolf's Gap, is completed, and from the East Tennessee & Western North Carolina road, which connects at Johnson's depot, 25 miles from Bristol. The operating expenses of the road were about 62½ per cent. of the receipts, in 1869, while for the last year they were but 56 per cent.

Two first-class passenger coaches have been added to the equipment since the last report, and two new locomotives have been ordered. It is advised that new iron be laid as fast as the company's means will permit; also that two new locomotives be added to the present stock of 39.

The car equipment consists of 12 first-class and 9 second-class passenger coaches, 7 mail and baggage, 1 pay, 1 wrecking, 312, box, 54 coal, 83 platform, 10 stock, 7 cab and 62 hand cars.

The following are the officers of the company:

Directors.—Joseph R. Anderson, William Galbraith, C. M. McGhee, P. Dickinson, Robert Snead, Thomas G. Barrett, Joseph H. Jaques, John White, R. T. Wilson, R. C. Jackson, G. M. Branner, S. D. Reynolds, Joseph Callaway, E. W. Cole, Joseph H. Earnest.

President, R. T. Wilson; Vice-President, Joseph Jaques; Superintendent, R. C. Jackson; Secretary and Treasurer, James G. Mitchell; Auditor, O. H. P. Rogan.

Another Atlantic Cable.

We learn that the American Atlantic Telegraph Cable Company, chartered by our State in 1866 and by act of Congress in 1867, has been reorganized by the choice of A. F. Willmarth (of the Atlantic & Pacific Telegraph Co.) as President, the Hon. S. C. Pomeroy, Vice-President, the Hon. Edward Haight (President Bank of Commonwealth), Treasurer, and W. O. Stoddard, Secretary, and, having procured from Holland and Russia the necessary concessions which they were disappointed in *not* obtaining from France, they now possess all the privileges they require in either hemisphere, and expect to lay their first cable across the Atlantic during the ensuing summer, making New York its American landing-place. They are, and purpose to remain, wholly independent of all other Atlantic telegraph companies, but they mean to extend their line to Russia at an early day, and to be intimately connected with the telegraphic system of that country, and, through that, with China. The company has authorized an issue of twenty-year gold bonds to the amount of $6,000,000, whereof the proceeds are to be devoted to the early and vigorous prosecution of their enterprise.—*New York Tribune.*

Governmental Supervision of Railroads.

The *Commercial and Financial Chronicle*, publishes the following extract from the manuscript of the forthcoming new edition of Amasa Walker's economical work entitled the "Science of Wealth," where it appears under the head of "Obstructions to trade." It is valuable as indicating the opinions of one of the most eminent and influential political economists of the country, who has made a study of trade as well as the science of political economy:

One very serious obstacle to the general trade of the of the country, foreign and domestic, is the heavy railroad tolls imposed in consequence of extensive combinations by managers of different naturally competing lines, who are thus enabled to establish exorbitant rates of freight.

This has already become an evil of great magnitude, and is evidently increasing with the constant extension of railroads, and the increase of these combinations, so that the industry of some sections of the country is already sensibly affected by it.

The results of these monopolies are two-fold: 1. They discourage production, for when it takes the value of one bushel of wheat to get another bushel to market, the inducement to raise wheat is diminished; so of all other products. The consequence is that farmers cannot afford to cultivate their least productive lands at all, except so far as they consume their own products, or find sale for them near home.

2. To increase the cost of products at the place of exportation, is to diminish trade, especially foreign commerce. All that is excessive in tolls is just so much protection to the agriculture of other countries. If it costs ten or fifteen cents per bushel more to transport wheat from Iowa to New York than it ought, the wheat grower on the shores of the Black Sea who competes with the American producer in the markets of Europe has the full advantage of it, and will increase his production and profits accordingly.

Duties upon exports which come finally into competition with foreign productions, are justly considered injurious to the industry and trade of a country; but excessive tolls have the same effect besides being more objectionable from the consideration that while duties would go into the public treasury, and constitute a part of the national revenue, and thus relieve the whole people of a part of the public burdens, tolls only enrich the few who own or manage railroads.

This evil, already great, will doubtless become more and more onerous until Congress interferes by some general legislation upon the subject. It is not our province to argue a point of Constitutional Law, but if Congress has the power "*to regulate commerce with foreign nations and among the several States*" it would seem quite clear that it had a right to legislate upon a matter so essential to the very existence of commerce, and the welfare of the different sections of the Union as that of international transportation. Foreign commerce has ever been under the special guardianship of the national legislature, but how much more so, ought the domestic trade of the country to receive its watchful supervision, that no obstacle be interposed to the most free and full development of the national industry.

We think this subject worthy of immediate attention on the part of our statesmen as well as the general public. Ought not the entire railroad system to be placed under the care and control of the Secretary of the Interior, duly authorized to require such returns annually, or oftener, of all railroad and transportation companies, as will afford definite information upon every point essential to a full understanding of their operations, their organization and management? If a Comptroller of the Currency is necessary, why not a Comptroller of Railroads?

Canadian and English Railroads Compared.

In an article on the Grand Trunk Railway the *Canadian Monetary Times* says:

When comparisons are made, as they often are, between the working expenses of the English railways and those of the Dominion, a number of most important considerations are left out of sight. English railways do not have to compete with the low freights and fares and luxurious accommodation of the leading American lines—a kind of competition to which any trunk line in this country is necessarily subjected. With expenses of necessity much greater, the Grand Trunk does not obtain more than from one-third to one-half the fares charged by an English railway for a much lower average of accommodation and comfort in traveling. The great English lines, for instance, obtain coal at a little over a dollar a ton for the use of their engines. Compare that with what is paid here for fuel and see the disparity; other important items are in the same proportion. A warmed carriage on a Canadian line is far more comfortable than the best of first-class English coaches, which are never warmed, however cold and damp the weather may be; yet, in this country the same rate only is charged for the best accommodation as is paid in England for seats in those mere dog-kennels called "third-class." The density of population in England, and the large mass of rich persons who travel much for pleasure, gives them a traffic vastly in excess of ours. There, too, the roadway, plant, staff of officials, are all utilized to the utmost, while on the Grand Trunk enormous stretches of permanent way lay between stations over which nothing rolls but through traffic; yet for this plant must be maintained and officials retained, the services of which are only occasional. The English lines, too, run the year through with hardly any hindrances from the weather; here, not only are there constant difficulties from this source, but the whole traffic for some months is depressed to a very low average, both for passengers and freight, during which period heavy expenses are entailed in keeping the permanent way open and safe.

Every effort is, we are convinced, being put forth by the management to give greater facility to public travel and traffic. Since the commencement of the present year the rolling stock has been increased by 12 locomotives, 40 passenger and emigrant and 320 freight cars. The fast trains run since the beginning of summer have proved a boon, especially to business men. A large quantity of steel and iron rails have been laid down, so that the track is in a better condition than ever before.

Working Expenditure.

We do not know that there is any limit to that large part of railway working expenditure which consists of *renewals*. There is a limit to what may be properly called necessary working and maintenance expenses, but you may spend what you like in putting down steel rails in place of iron, or indeed in extensive renewals with iron rails, and in renewals of the rolling stock, that is, of the engines, carriages and wagons.

Here, as we have said, any sum can be spent. If a railway had £100 a mile a week traffic, and £50 of it were fairly working profit, it would be perfectly easy to expend £30, £40, or even the whole £50 of profit in renewing and improving the line and its working stock. It is true that if a railway company spend unusually large sums of their revenue in permanent and useful improvements the proprietors will themselves get the benefit of it at some future time—provided always that they have lives long enough to live through the period during which the extensive improvements are made.

Of the two errors, that of under-charging and that of over-charging for renewals, it is undoubtedly better to lean towards the one which is commonly said to be on the right side—on the side of excessive charge; but we question whether it is justifiable to lean too much on that right side. For what does it amount to? It amounts to handing over to B the profits which fairly belong to A. A, the existing shareholder, is entitled to the profits for the time being earned by the line in which he is a shareholder. As of right they belong to him, but if the management use those profits for renewals and improvements so extensively that the dividends are postponed until after his death, that which is his is given over to others, his successors.

We admit that it is very desirable, and a first duty on the part of directors to place their railway and working stock in the best condition, for such a condition is the very foundation of a line's prosperity, but still they should exercise care that injustice is not thereby done to their present proprietary, and that at least the latter should know the extent to which the "error on the right" is carried, in order that they may avoid making the frightful sacrifice of selling, while it is temporarily depressed to a heavy discount, stock which is really valuable.—*Herapath's Railway Journal.*

How Conductors are Ruined.

"A Repentant Railroad Detective," who has now embarked in a more respectable calling, makes the following interesting *expose* of the manner in which innocent railroad conductors are ruined:

"Up to the commencement of the present year I have been employed as a railroad detective. Having found a more honest employment (and by way of penance for the past), I feel desirous of making some amends to that class of men that I have heretofore aided in unjustly in many cases, villifying, by giving a few facts of the workings of that unscrupulous gang known as railroad detectives, so as to open the eyes of our railroad officials to the injustice of condemning innocent men upon the word of such as now belong to that gang. Any railroad company can ascertain that nine-tenths of conductors accused of dishonesty are accused unjustly.

"The plan is, when a contract to work on a road is taken, to first select a victim; to suppose at once that he is guilty, and reversing the maxim of the common law, to either find or manufacture material to establish the premises. A miracle alone can save him. The reputation of the men set to watch him is at stake, and they feel that it is incumbent upon them to bring him in guilty of fraudulent practices.

"One dodge is to get one to ask a conductor to change a bill for accommodation, while another witnesses the operation and swears—and swears technically true—that he saw the conductor receive money, and neither return nor punch a ticket. Another plan is to buy two tickets at the office in one day, present one to the conductor and retain the other, reporting that the conductor took it but did not punch it. In the meanwhile, the unsold ticket is given to a confederate, who will start the next day on the same train from the same place, and present the ticket sold the day before to the conductor, who, if he does not notice the date, is trapped. It is a very successful plan, as it hangs both conductor and agent.

"Another dodge is this: Several 'spotters' crowd around the conductor, calling at once for tickets, and offering money for different points on the road. The one who pays for the point furthest off will manage to get the ticket from the conductor that belongs to the one paying for the nearest point. Some of the gang then get off at the first station, leaving all the tickets in the hands of one or two, who go the whole distance, giving up the long tickets, and holding the short ones as evidence against the conductor. Here a case is made, and the conductor cannot make a satisfactory explanation.

"These are a few of the nefarious and rascally schemes used by detectives. I do not say that conductors as a class are any more honest than any other class; but the really dishonest ones are often in the 'ring' and are seldom reported. These are facts, and I could, were it expedient, give you names of parties who I know have been unjustly dealt with. I have done all in my power for them, have been to the executive, and in one case have succeeded in having reinstated a man whom I believe to be strictly honest. And I now take another step in the vindication of those wronged through the public prints. Let the managers of railroads see and think, that an evil may be remedied. Let them first select honorable men for this responsible position, and then treat them as men."

The Law Concerning Putting Off Passengers.

In the Cook County Circuit Court, last week, a case was tried in which Nathaniel Shelton sued the Michigan Southern & Northern Indiana Railroad Company to recover for damages (estimated at $50,000) alleged to have been sustained by plaintiff, he having been put off the train of defendant between stations. The *Tribune* reports it as follows:

"The claim was that plaintiff took passage at Elkhart, Ind., on the defendant's train, his destination being South Bend, on the 14th of April, 1868. Having taken a seat, the conductor took up his ticket. He then went into another car, on the same train, and, being there, the conductor a second time demanded his ticket or fare; he informed the conductor that he had already delivered his ticket, but, notwithstanding this, the conductor stopped the train and caused him to be put off it, at a point some miles distant from a station. He re-ascended into the car as the train started, and then (he alleged) he was kicked from it, while the car was in motion. He fell to the ground and was so injured that his arm had to be amputated. The company claimed that the plaintiff did not at any time give up a ticket; that he was drunk, and refused to pay; that the injury to him resulted from his attempt to remount the car, and not from any attempt to put him off.

"The instructions to the jury were, in substance, that a railroad conductor is not legally authorized to put a passenger from his train on account of the passenger's refusal to pay his fare merely, at any place other than a regular station; if he needs to remove a passenger, it should be at a station. But, if plaintiff (although there was a wrongful expulsion), being safely upon the ground and beyond the reach of harm, of his own rashness or negligence suffered the loss of a limb, then the injury so resulting could not be ascribed to damages by the defendant. A conductor, even if warranted in ejecting a passenger, can only use necessary force—the object to be attained being the criterion; he may not kick or abuse him. So, if he was kicked, and, because he was kicked, plaintiff fell and was injured, then he could recover. But plaintiff, that he may maintain the action, must prove that he held a ticket, and offered to surrender it when it was called for by the conductor, or offered to pay his fare, or that in ejecting him unnecessary force was used, from which he received his injuries, added to which he must show that his own negligence did not materially aid in bringing about the result. If he had a ticket and refused to surrender it, then the conductor might eject him, even between stations, providing, however, reasonable care was taken to guard him from injury. So, if plaintiff was injured in an attempt to regain the car, it being in motion, there could be no recovery."

The jury brought in a verdict for the plaintiff, awarding $4,000 damages. The plaintiff has made a motion for a new trial.

Insurance of Railroads.

The railway property in this country is usually insured under what are called blanket policies; this style of policy being usually preferred by railway managers. They are sometimes made to cover millions of dollars in a single risk, and the premium is, of course, correspondingly large. The Liverpool & London & Globe has a risk of $1,500,000 on the Grand Trunk Railway, and another on an American railway to the amount of $2,000,000. These blanket policies are very liberal in their provisions. They usually read as follows: "To the sum of ——— on any property belonging to the ——— railroad company, and on any property for which they may be liable, it matters not of what the property may consist, nor where it may be; provided the property is on premises owned or occupied by the ——— railroad company, and situated on the line of their road, or any branch road operated by them. Liberty to alter or repair any premises hereby insured as the interest of the assured may require. Liberty for other insurance whether contemporaneous or future. Loss not to exceed $25,000 at any one fire." Most of the American fire offices eschew this kind of business, though for what reason we are not aware. Those of them who cultivate railroad insurance issue special policies at 1¼ to 1½ per cent., covering the stations, cars, freight, &c., and usually limit their loss by any one fire to say $5,000. To these special policies blanket policies are sometimes added to cover any property that may not be embraced in such special policies, and to secure a larger amount of compensation in case of disastrous fire.—*Canadian Monetary Times.*

WANTS.

☞ Short Advertisements will be inserted under this head at ten cents per line for the first insertion, and five cents per line for each subsequent insertion.

WANTED—A completed file of the Railroad Advocate published in New York by Zerah Colburn about 15 years ago. A purchaser can be found by applying at this office personally or by letter.

AN ENGINEER experienced in railroad location and construction as Principal Assistant and Chief is open to an engagement. For further information inquire of the editor of this paper.

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For the Third or Last Division

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From Simcoe to Canfield,

THIRTY MILES.

PLANS AND SPECIFICATIONS

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10 O'CLOCK ON THE MORNING OF

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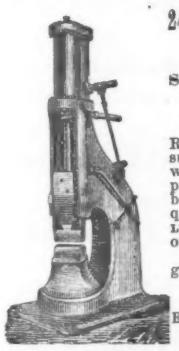

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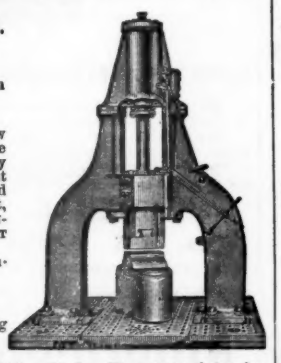

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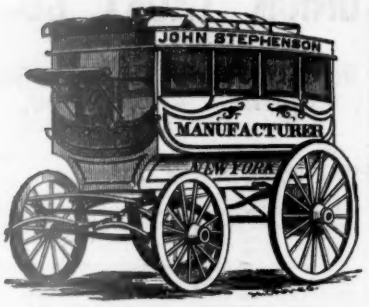

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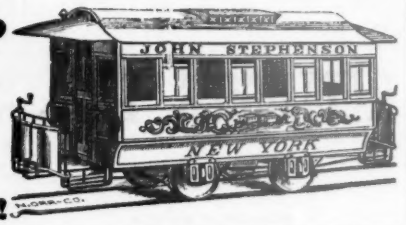

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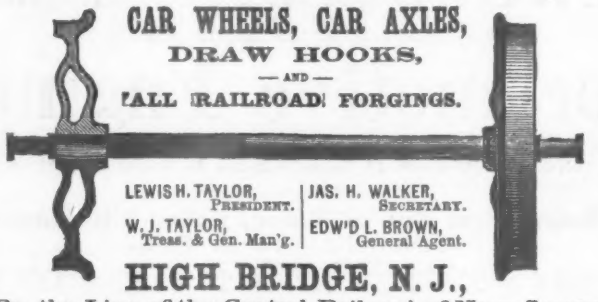

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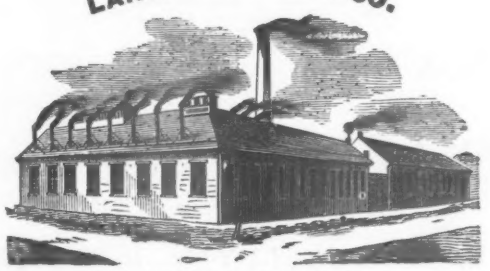

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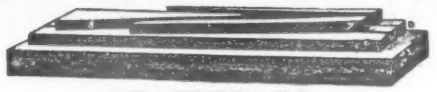

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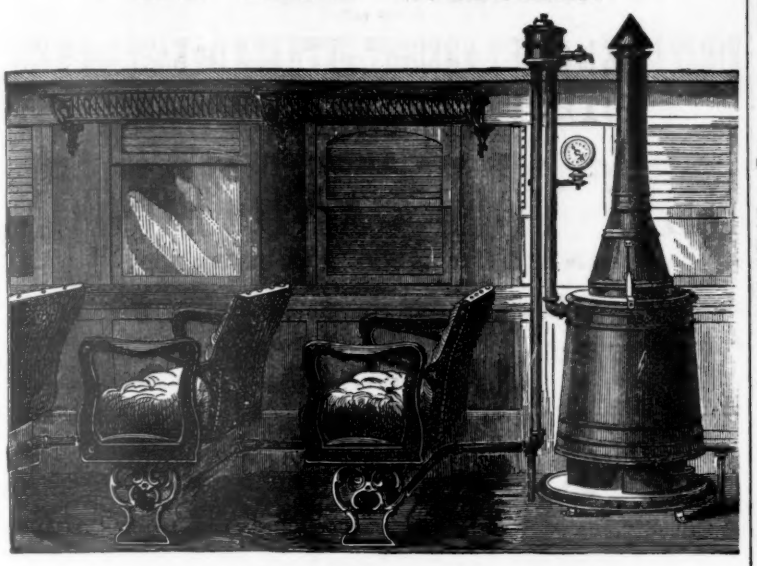

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It is especially adapted to, and extensively used by leading Railroads of the country for the purpose of securing nuts on railway joints.

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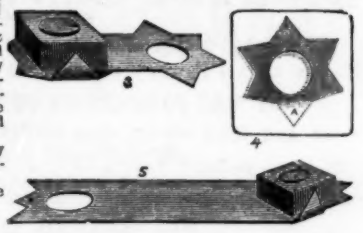
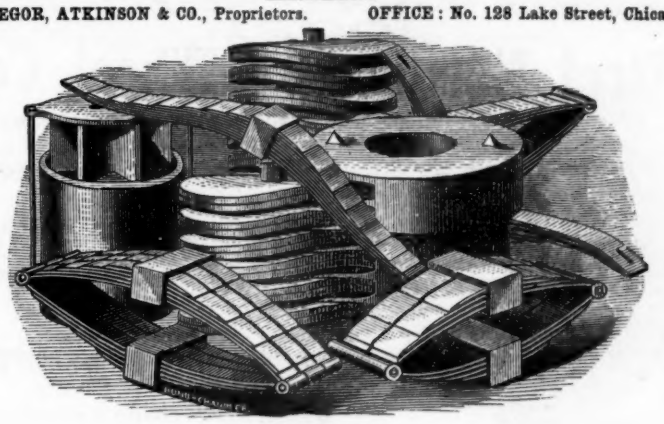


A. GIBBONS, Coatesville, Pa.

The Chicago Spring Works.

McGREGOR, ATKINSON & CO., Proprietors. OFFICE: No. 128 Lake Street, Chicago.

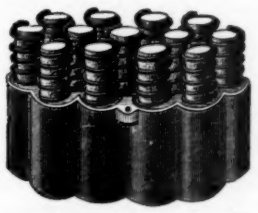


MANUFACTURERS OF

EXTRA TEMPERED LIGHT ELLIPTIC CAST STEEL SPRINGS AND THE "DANIELS" PAT. CAR SPRING.

Union Car Spring Mf'g Co.

Sole Proprietors of the



Wool-Packed Spiral.

Hebbard.

HEBBARD CAR SPRING!

Offices: No. 4 Dey St., New York, and 19 Wells St., Chicago.

FACTORIES: JERSEY CITY, N. J., and SPRINGFIELD, MASS.

Vose, Dinsmore & Co.,
NATIONAL SPRING WORKS,

MANUFACTURERS OF

VOLUTE BUFFER, INDIA RUBBER, RUBBER CENTER SPIRAL, COMPOUND SPIRAL, "DINSMORE,"

AND OTHER

RAILWAY CAR SPRINGS.

"Dinsmore" Spring.

Volute Buffer Spring.

Group Rubber Center Spiral Spring.

No. 1 Barclay St., NEW YORK. | No. 15 La Salle St., CHICAGO

WORKS ON 129th AND 130th STREETS, NEW YORK.

GENERAL FREIGHT DEPARTMENT.

The Illinois Central Railroad

ARE PREPARED TO TAKE FREIGHT FOR

Cairo, St. Louis, Peoria,

BLOOMINGTON, SPRINGFIELD, JACKSONVILLE,

And All Points in the Central and Southern parts of the State;

MOBILE & NEW ORLEANS BY RAIL OR RIVER

And ALL POINTS on the MISSISSIPPI below CAIRO. Also, to

Freeport, Galena and Dubuque.

☞ Freight Forwarded with Promptness and Despatch, and Rates at all times as LOW as by any other Route.

BY THE COMPLETION OF THE BRIDGE AT DUNLEITH,

THEY ARE ENABLED TO TAKE FREIGHT TO ALL POINTS WEST OF DUBUQUE ☞ WITHOUT CHANGE OF CARS! ☜

DELIVER FREIGHT IN CHICAGO ONLY at the FREIGHT DEPOT of the Company, foot of South Water St. Parties ordering Goods from the East should have the packages marked:

"Via Illinois Central Railroad."

For THROUGH BILLS OF LADING, and further information, apply to the LOCAL FREIGHT AGENT at Chicago, or to the undersigned.

M. HUGHITT, Gen. Supt. J. F. TUCKER, Gen. Freight Agt.

MOORE

Steel Elastic Car Wheel Co.

OF NEW JERSEY.

Proprietors of

MOORE'S PATENT

FOR THE MANUFACTURE OF

ELASTIC CAR WHEELS,

FOR PASSENGER AND SLEEPING COACHES.

Noiseless, Safe, Durable and Economical.

Also, Manufacturers of

CAR WHEELS OF EVERY DESCRIPTION.

H. W. MOORE, President.
JAS. K. FROTHINGHAM, Secretary.
F. W. BLOODGOOD, Treasurer.

Works, cor. Green and Wayne Sts., JERSEY CITY, N. J.
P. O. Address—Box 129, Jersey City, N. J.

American Compound Telegraph Wire.

More than 3000 Miles now in Operation,

Demonstrating beyond question its superior working capacity, and great ability to withstand the elements. For RAILROAD LINES, connecting a single wire with a large number of Stations, and for long circuits, this wire is peculiarly adapted; the large conducting capacity secured by the copper, with other advantages, rendering such lines fully serviceable during the heaviest rains.

Having a core of steel, a small number of poles only are required, as compared with iron wire construction, thereby preventing much loss of the current from escape and very materially reducing cost of maintenance OFFICE AMERICAN COMPOUND TELEGRAPH WIRE CO.
234 West 29th Street, New York.

BLISS, TILLOTSON & CO., Western Agents,
247 South Water Street, Chicago.

CHAS. J. PUSEY, P. O. Address—Box 5222. EDW'D H. PARDEE

Pusey & Pardee,

74 BROADWAY, NEW YORK.

American and English Rails,

LOCOMOTIVES AND CARS FISH-PLATES, SPIKES, &c.

—SOLE AGENTS FOR—

Atkins Brothers' Pottsville Rolling Mills, and G. Buchanan & Co., of London.

☞ Special attention given to filling orders for small T and STREET RAILS, of every weight and pattern.

OLD RAILS BOUGHT OR RE-ROLLED, AS DESIRED.

J. E. FRENCH. W. S. DODGE. D. W. CROSS.

Winslow Car Roofing Company.

PATENT IRON CAR ROOFS.

Established, 1859.

No. 211 Superior St. **CLEVELAND, O.**

Over 20,000 Cars covered with this Roof! We claim that these Roofs will keep Cars dry, and will last as long as the Cars they cover without any extra expense after once put on.

☞ SEND FOR CIRCULARS.

THE

"RED LINE!"

—RUNNING OVER THE—

Michigan Southern and Lake Shore R. R.'s,

—WAS THE—

FIRST LINE to CARRY FREIGHT BETWEEN the EAST and WEST,

WITHOUT CHANGE OF CARS!

CARS RUN THROUGH TO

NEW YORK AND BOSTON,

IN FOUR AND FIVE DAYS!

☞ Contracts made at the Offices of the Line. ☜

C. Shutter, Agent, 247 Broadway, New York. A. Cushman, Agent, Old State House, Boston, Mass.

W. D. MANCHESTER, Agent, 54 Clark St., Chicago.

Great Central Route.

"BLUE LINE."

ORGANIZED JANUARY 1, 1867.

1870.

1870.

OWNED AND OPERATED BY THE

Michigan Central, Illinois Central, Chicago, Burlington & Quincy, Chicago & Alton, Great Western (of Canada), New York Central, Hudson River, Boston & Albany, and Providence and Worcester Railroads.

THE "BLUE LINE" is the only route that offers to shippers of freight the advantages of an unbroken gauge through from Chicago to the Seaboard, and to all Interior Points on the line of Eastern Connections beyond Suspension Bridge and Buffalo. All Through Freight is then transported between the most distant points of the roads in interest,

WITHOUT CHANGE OF CARS!

The immense freight equipment of all the roads in interest is employed, as occasion requires, for the through service of this Line, and has of late been largely increased. This Line is now prepared to extend facilities for the transit and delivery of all kinds of freight in Quicker Time and in Better Order than ever before.

The Blue Line Cars

are all of a solid, uniform build, thus largely lessening the chances of delay from the use of cars of a mixed construction, and the consequent difficulty of repairs, while remote from their own roads. The Blue Line is operated by the railroad companies who own it, without the intervention of intermediate parties between the Roads or Line and the public.

Trains run through with regularity **IN FOUR OR FIVE DAYS** to and from New York and Boston. Especial care given to the Safe and Quick Transport of Property Liable to Breakage or Injury, and to all **Perishable Freight.**

Claims for overcharges, loss or damage, promptly settled upon their merits. Be particular and direct all shipments to be marked and consigned *via*

"BLUE LINE."

☞ *FREIGHT CONTRACTS* given at the offices of the company in Chicago, New York and Boston.

J. D. HAYES, GEN. MANAGER,.. Detroit.

C. E. NOBLE,..... } 349 Broadway, N. Y. | P. K. RANDALL, 69 Washington St., Boston.
GEO. E. JARVIS,... } | W. W. STREET,.....91 Lake St., Chicago.
N. D. MUNSON,.....Quincy, Ill. | J. JOHNSON,.....Cairo, Ill.

THOS. HOOPS, GEN. FR'T AGT. Michigan Central Railroad, Chicago.
A. WALLINGFORD, AGT. M. C. & G. W. R. R., No. 91 Lake St., Chicago.
N. A. SKINNER, Freight Agent Michigan Central Railroad.

Empire Line.

THE EMPIRE TRANSPORTATION COMPANY'S

Fast Freight Line to the East

—AND—

TO THE COAL AND OIL REGIONS,

Via Michigan Southern, Lake Shore, and Philadelphia & Erie R. R.'s,

WITHOUT TRANSFER!

Office, No. 72 LaSalle Street, Chicago.

GEO. W. RISTINE, Western Superintendent, Cleveland, Ohio.

W. G. Van Demark,..265 Broadway, New York. | E. L. O'Donnell,.....Baltimore, Md.
G. B. McCulloh,....42 South 5th St., Philadelphia. | Wm. F. Smith,.....Erie, Penn

JOHN WHITTAKER, Pier 14 North River, New York.

JOSEPH STOCKTON, Agent, Chicago.

W. T. HANCOCK, Contracting Agent.
WM. F. GRIFFITTS, Jr., Gen. Freight Agent, Philadelphia.

CHICAGO & NORTHWESTERN R. W.

Comprising the PRINCIPAL RAILROADS from CHICAGO Directly NORTH NORTH-WEST and WEST.

ALL RAIL TO THE PACIFIC OCEAN!

Great California Line.

TRAINS LEAVE WELLS STREET DEPOT AS FOLLOWS:

8:15 A. M. Cedar Rapids Pass	**9:15 P. M. Night Mail.**
10:30 A. M. Pacific Express.	**9:15 P. M. Rock Island Pass.**
10:30 A. M. Rock Island Exp.	**4:00 P. M. Dixon Passenger.**

For Sterling, Rock Island, Fulton, Clinton. Cedar Rapids, Boone, Denison, Missouri Valley Junction, Sioux City, Council Bluffs and Omaha, there connecting with the

UNION PACIFIC R. R.

For Cheyenne, Denver, Ogden, Salt Lake, the White Pine Silver Mines, Sacramento, San Francisco, and all parts of Nebraska, Colorado, New Mexico, Arizona, Wyoming, Montana, Idaho, Utah, Nevada, and the PACIFIC COAST.

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
To OMAHA,.....	23	$20.00	To SACRAMENTO,.	4½	$118.00
" DENVER,.....	52	70.75	" SAN FRANCISCO,	5	118.00

TRAINS ARRIVE:—Night Mail, **7.00** a. m.; Dixon Passenger, **11.10** a. m.; Pacific Express, **3:50** p. m.; Rock Island Express, **3:50** p. m.; Cedar Rapids Passenger, **6:50** p. m.

FREEPORT LINE.

9.00 A. M. & 9.45 P. M. For Belvidere, Rockford, Freeport, Galena, Dunleith, and St. Paul.

4.00 P. M., Rockford Accommodation.
5.30 P. M., Geneva and Elgin Accommodation
6.10 P. M., Lombard Accommodation.
5:50 P. M., Junction Passenger.

TRAINS ARRIVE:—Freeport Passenger, **2:30** a. m., **3:00** p. m.; Rockford Accommodation, **11:10** a. m.; Geneva and Elgin Accommodation, **8:45** a. m.; Junction Passenger, **8:10** a. m.; Lombard Accommodation, **6:50** a. m.

WISCONSIN DIVISION.

☞ Trains leave Depot, cor. West Water and Kinzie Sts., daily, Sundays excepted, as follows:

10.00 A. M. DAY EXPRESS, for Janesville, Monroe, Whitewater, Madison, Prairie du Chien, Watertown, Minnesota Junction, Portage City, Sparta, La Crosse, St. Paul, and ALL POINTS ON THE UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh. Neenah, Appleton, and Green Bay.

3.00 P. M., Janesville Accommodation.

5.00 P. M. NIGHT EXPRESS, for Madison, Prairie du Chien, Watertown, Minnesota Junction, Portage City, Sparta, La Crosse, St. Paul, and ALL POINTS ON THE UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh, Menasha, Appleton, Green Bay, and THE LAKE SUPERIOR COUNTRY.

5.30 P. M., Woodstock Accommodation.
6:20 P. M., Barrington Passenger.

TRAINS ARRIVE:—5:30 a. m., **7:45** a. m., **1 :10** a. m., **1:00** p. m. and **7:15** p. m.

MILWAUKEE DIVISION.

MILWAUKEE MAIL,	**8:00 A. M.**
EXPRESS, (ex. Sun) Waukegan, Kenosha, Racine and Milwaukee,.....	**9:45 A. M. 5:00 P M.**
EVANSTON PASSENGER,	**11:40 A. M.**
HIGHLAND PARK PASSENGER,	**1:15 P. M.**
MILWAUKEE ACCOMMODATION, with Sleeping Car attached.....	**11:00 P. M.**
EVANSTON ACCOMMODATION, (Daily,) from Wisconsin Div. Depot.....	**1:30 P. M.**
KENOSHA ACCOMMODATION, (Sundays excepted) from Wells St. Depot.....	**4:15 P. M.**
AFTERNOON PASSENGER, from Milwaukee Div. Depot.....	**5:00 P. M.**
WAUKEGAN ACCOMMODATION, (except Sundays) from Wells St. Depot.....	**5:25 P. M.**
WAUKEGAN PASSENGER, (Sundays excepted) from Wells St. Depot.....	**6:15 P. M.**

TRAINS ARRIVE:—Night Accommodation, with Sleeping Car, **5:00** a. m.; Day Express, **4:10** p. m. Milwaukee Mail, **10:10** a. m.; Afternoon Passenger, **8:00** p. m.; Waukegan Accommodation, **8:2** a. m.; Kenosha Accommodation, **9:10** a.m.; Evanston Accommodations, **1.40** and **4.00** p. m.; Waukegan Passenger, **7:55** a. m.; Highland Park Passenger, **3.45** p. m.

PULLMAN PALACE CARS ON ALL NIGHT TRAINS.

THROUGH TICKETS Can be purchased at all principal Railroad Offices East and South, and in Chicago at the Southeast corner of Lake and Clark Streets, and at the Passenger Stations as above.

H. P. STANWOOD, Gen. Ticket Agt.
GEO. L. DUNLAP, Gen'l Supt.

Milwaukee & St. Paul R. W.

THE ONLY ALL RAIL LINE TO

ST. PAUL AND MINNEAPOLIS!

AND ALL PORTIONS OF

Wisconsin, Minnesota & Northern Iowa.

PURCHASE TICKETS VIA MILWAUKEE.

Passengers Going via Milwaukee,

Have Choice of Seats in Clean Coaches, and on Night Trains, a full night's rest in Palace Sleeping Cars.

☞ BAGGAGE CHECKED THROUGH BY THIS ROUTE ONLY! ☜

PASSENGERS FROM CHICAGO can obtain these Advantages only by the MILWAUKEE DIVISION of the CHICAGO & NORTHWESTERN R'Y.

SPECIAL NOTICE.—Passengers destined to any place in Wisconsin, Minnesota, or Northern Iowa, either on or off the Lines of this Company, who cannot procure Through Tickets to their destination, should purchase their Tickets **TO MILWAUKEE,** as this is the Great Distributing Point for these States.

A. V. H. CARPENTER, Gen. Pass. Agt. Milwaukee.
S. S. MERRILL, Gen. Manager, Milwaukee.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD.

☞ THE DIRECT ROUTE FOR ☜

JOLIET, MORRIS, OTTAWA, LASALLE, PERU, HENRY, PEORIA,
Lacon, Geneseo, Moline,

ROCK ISLAND, DAVENPORT,

Muscatine, Washington, Iowa City,
GRINNELL, NEWTON, DES MOINES,

COUNCIL BLUFFS & OMAHA!

CONNECTING WITH TRAINS ON THE UNION PACIFIC RAILROAD, FOR

Cheyenne, Denver, Central City, Ogden, Salt Lake, White Pine, Helena, Sacramento, San Francisco,

And Points in Upper and Lower California; and with Ocean Steamers at San Francisco, for all Points in **China, Japan, Sandwich Islands, Oregon and Alaska.**

☞ TRAINS LEAVE their Splendid new Depot, on VanBuren Street, Chicago, as follows:

	LEAVE.	ARRIVE.
PACIFIC EXPRESS, (Sunday excepted)..	**10.00 a. m.**	**4.15 p. m.**
PERU ACCOMMODATION, (Sundays excepted).....	**4.30 p. m.**	**9.45 a. m.**
PACIFIC EXPRESS, (Saturdays excepted,).....	**10.00 p. m.**	[Mon. ex. **7.00 a. m.**

ELEGANT PALACE SLEEPING COACHES!

Run Through to Peoria and Council Bluffs, Without Change.

☞ Connections at LA SALLE, with Illinois Central Railroad, North and South; at PEORIA, with Peoria, Pekin & Jacksonville Railroad, for Pekin, Virginia, &c.; at PORT BYRON JUNCTION, for Hampton, LeClaire, and Port Byron; at ROCK ISLAND, with Packets North and South on the Mississippi River.

☞ **For Through Tickets,** and all desired information in regard to Rates, Routes, etc., call at the Company's Offices, No. **37** South Clark Street, Chicago, or **257** Broadway, New York.

A. M. SMITH, Gen. Pass. Agent. **HUGH RIDDLE,** Gen. Supt. **P. A. HALL,** Asst. Gen. Supt.

KANSAS PACIFIC RAILWAY.

Great Smoky Hill Route,

Now Completed and Open for Business Through to

DENVER, COLORADO.

There Connecting with the DENVER PACIFIC RAILROAD for CHEYENNE, forming, in Connection with the UNION and CENTRAL PACIFIC RAILROADS, another ALL-RAIL ROUTE to

CALIFORNIA, NEVADA, UTAH, MONTANA,

WYOMING, COLORADO, &C.

The most available Passenger and Freight Route to Lawrence, Topeka, Junction City, Abilene, Salina, Hays, KIT CARSON, River Bend, DENVER, CHEYENNE, OGDEN, SALT LAKE CITY,

Sacramento, and San Francisco.

☞ Close Connections are made in Union Depots at KANSAS CITY and STATE LINE with Express Trains of the HANNIBAL & ST. JOSEPH, NORTH MISSOURI and MISSOURI PACIFIC RAILROADS.

Southern Overland Passenger and Mail Coaches leave Kit Carson daily for Pueblo, Trinidad, Fort Union, Santa Fe, &c.

Hughes & Co.'s Splendid Concord Coaches leave Denver daily for Central City, Georgetown, &c.

Passenger and Freight Rates always as low and conveniences as ample as by any other Route.

PULLMAN'S PALACE CARS ACCOMPANY NIGHT EXPRESS TRAINS.

Through Tickets can be obtained at all principal ticket offices. Be careful to ask for tickets via Kansas Pacific Railway, "Smoky Hill Route."

5,000,000 Acres of Farming Lands For Sale!

Situated along the line of this Great National Railway. For particulars, address JNO. P. DEVEREUX, Land Commissioner, Lawrence, Kansas.

R. B. GEMMELL, Gen. Freight & Ticket Agt. **A. ANDERSON,** Gen. Supt.

THE ERIE & PACIFIC DISPATCH CO.

Are Authorized Freight Agents.

For information, Contracts, and Bills of Lading, apply at their office, 64 Clark Street, Chicago.

H. H. RAPP, AGT.

Western Union Railroad.

CHICAGO & NORTHWESTERN DEPOT, CHICAGO. | MILWAUKEE & CHICAGO DEPOT, MILWAUKEE.

THE DIRECT ROUTE!

CHICAGO, RACINE & MILWAUKEE,

— TO —

Beloit, Savanna, Clinton, Pt. Byron, Davenport, Mineral Point, Madison, Freeport, Fulton, Lyons, Rock Island, Sabula, Galena, Dubuque, Des Moines, Council Bluffs,

OMAHA, SAN FRANCISCO

AND ALL PRINCIPAL POINTS IN

Southern and Central Wisconsin, Northern Illinois, and Central and Northern Iowa.

FRED. WILD, Gen. Ticket Agent.
D. A. OLIN, Gen. Superintendent.

THE FAVORITE THROUGH PASSENGER ROUTE!

Chicago, Burlington & Quincy
RAILROAD LINE.

3 THROUGH EXPRESS TRAINS DAILY!

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
TO OMAHA, - - -	23	$20.00	TO DENVER, - -	2½	$63.00
" ST. JOSEPH, - -	21	19.50	" SACRAMENTO, -	4½	118.00
" KANSAS CITY, -	22	20.00	" SAN FRANCISCO,	5	118.00

TRAINS LEAVE CHICAGO from the Great Central Depot, foot of Lake Street, as follows:

BURLINGTON, KEOKUK, COUNCIL BLUFFS & OMAHA LINE

7:40 A. M. MAIL AND EXPRESS, (Except Sunday,) stopping at all stations; making close connections at Mendota with Illinois Central for Amboy, Dixon, Freeport, Galena, Dunleith, Dubuque, LaSalle, El Paso, Bloomington, &c.

10:45 A. M. PACIFIC FAST LINE, (Except Sunday,) stopping at Riverside, Hinsdale, Aurora, Leland, Mendota, Princeton, Buda, Kewanee, Galva, Galesburg, and all stations West and South of Galesburg.
☞ ELEGANT DAY COACHES and PULLMAN PALACE DRAWING ROOM CARS are attached to this train daily from Chicago

TO COUNCIL BLUFFS & OMAHA WITHOUT CHANGE!

9.00 P. M. PACIFIC NIGHT EXPRESS, (Daily, except Saturday,) for Burlington, Ottumwa, DesMoines, Nebraska City, Council Bluffs, Omaha, and all points West. Pullman Drawing Room Sleeping Car attached to this Train daily from Chicago to Burlington, and Elegant Day Coaches, from Chicago to Council Bluffs and Omaha, without change! This is the Route between

CHICAGO, COUNCIL BLUFFS & OMAHA,

—RUNNING THE CELEBRATED—

Pullman Palace Dining Cars!

49 MILES THE SHORTEST ROUTE BETWEEN

Chicago & Keokuk,

And the Only Route Without Ferrying the Mississippi River!

QUINCY, ST. JOSEPH, LEAVENW'TH & KANSAS CITY LINE.

7.40 A. M. MAIL AND EXPRESS (Except Sunday,) stopping at all stations between Chicago and Galesburg; making close connections at Mendota with Illinois Central for Amboy, Dixon, Freeport, Dunleith, Dubuque, La Salle, El Paso, Bloomington, &c.

10:45 A. M. PACIFIC EXPRESS, (Daily, except Sunday,) with ELEGANT DAY COACHES and PULLMAN'S PALACE SLEEPING CARS attached, running through from Chicago to KANSAS CITY, Without Change!

9:00 P. M. PACIFIC NIGHT EXPRESS, (Daily,) with Pullman Palace Drawing Room Sleeping Car attached running through from Chicago to QUINCY,

Kansas City, Lawrence, Topeka and Denver,
☞ WITHOUT CHANGE! ☜

64 MILES THE SHORTEST AND ONLY ROUTE BETWEEN

Chicago and Kansas City!

WITHOUT CHANGE OF CARS OR FERRY.

115 MILES The Shortest Route bet. Chicago & St. Joseph.

THE SHORTEST, BEST AND QUICKEST ROUTE BETWEEN CHICAGO AND

Atchison, Weston, Leavenworth, Lawrence,

AND ALL POINTS ON THE KANSAS PACIFIC R'Y.

Local Trains Leave
RIVERSIDE & HINSDALE ACCOMMODATION.7:00 A. M. 1:30 & 6:15 P.M
GALESBURG PASSENGER.....3:00 P. M.
MENDOTA PASSENGER.....4:15 P. M.
AURORA PASSENGER.....5:30 P. M.

Ask for Tickets via Chicago, Burlington & Quincy Railroad, which can be obtained at all principal offices of connecting roads, at Company's office, 63 Clark Street, and at Great Central Depot, Chicago at as low rates as by any other route.

ROB'T HARRIS, Gen'l Superintendent, CHICAGO.
SAM'L POWELL, Gen'l Ticket Agent, CHICAGO.
E. A. PARKER, Gen. West. Pass. Agt., CHICAGO.

THE GREAT THROUGH PASSENGER ROUTE TO KANSAS

IS VIA THE OLD RELIABLE

HANNIBAL & ST. JOSEPH
SHORT LINE.

Crossing the Mississippi at Quincy and the Missouri at Kansas City on New Iron Bridges; running Three Daily Express Trains, Through Cars and Pullman Sleeping Palaces from Chicago & Quincy to St. Joseph & Kansas City.

The Advantages gained by this Line over any other Route from Chicago, are:

115 MILES THE SHORTEST!

To St. Joseph, Atchison, Hiawatha, Waterville, Weston, Leavenworth,

64 MILES THE SHORTEST!

To Kansas City, Fort Scott, Lawrence, Ottawa,

Garnett, Iola, Humboldt, Topeka, Burlingame, Emporia, Manhattan, Fort Riley, Junction City, Salina, Ellsworth, Hays, Sheridan, Olathe, Paola, Cherokee Neutral Lands, Baxter Springs, Santa Fe, New Mexico, and all Points on the KANSAS PACIFIC, and MISSOURI RIVER, FT. SCOTT & GULF R. R's, with which we connect at Kansas City Union Depot.

THIS BEING THE SHORTEST LINE AND QUICKEST, is consequently the cheapest; and no one that is posted thinks of taking any other Route from Chicago to reach principal points in

Missouri, Kansas, Indian Territory, or New Mexico.

DAILY OVERLAND STAGES from west end Kansas Pacific Railway, for Pueblo, Santa Fe, Denver, and points in Colorado and New Mexico.

This is also a most desirable Route, via St. Joseph, to Brownsville, Nebraska City, Council Bluffs, and Omaha, connecting with the Union Pacific Railroad for Cheyenne, Denver, Salt Lake, Sacramento, San Francisco, and the Pacific coast.

Through Tickets for Sale at all Ticket Offices. Baggage Checked Through, and Omnibus Transfers and Ferriage avoided.

P. B. GROAT, Gen. Ticket Agent.
HANNIBAL, Mo.
GEO. H. NETTLETON, Gen. Supt.
HANNIBAL, Mo.

Old, Reliable, Air-Line Route!

CHICAGO, ALTON & ST. LOUIS R. R.

SHORTEST, QUICKEST AND ONLY DIRECT ROAD TO

Bloomington, Springfield, Jacksonville, Alton

— AND —

ST. LOUIS!

WITHOUT CHANGE OF CARS.

THE ONLY ROAD MAKING IMMEDIATE CONNECTIONS AT ST. LOUIS WITH MORNING AND EVENING TRAINS

—FOR—

ATCHISON, LEAVENWORTH, KANSAS CITY,

Lawrence, Topeka, Memphis, New Orleans,

And All Points South and Southwest.

☞ TRAINS leave CHICAGO from the West-side Union Depot, near Madison Street Bridge. ☜

EXPRESS MAIL, [Except Sundays]	8:10 A. M.
LIGHTNING EXPRESS, [Except Saturdays and Sundays]	9:50 P. M.
NIGHT EXPRESS, [Daily]	6:00 P. M.
JOLIET ACCOMMODATION, [Except Sundays]	4:40 P. M.
JACKSONVILLE EXPRESS, [Daily]	6:00 P. M.

Trains arrive at Chicago at 8.00 P. M., 8.30 A. M. and 6:00 A. M. Joliet Accom., 9.40 A. M.

This is the ONLY LINE Between CHICAGO & ST. LOUIS RUNNING

Pullman's Palace Sleeping and Celebrated Dining Cars!

BAGGAGE CHECKED THROUGH.

Through Tickets can be had at the Company's office, No. 55 Dearborn street, Chicago, or at the Depot, corner of West Madison and Canal streets, and at all principal Ticket Offices in the United States and Canada. Rates of Fare and Freights as low as by any other Route.

A. NEWMAN, Gen. Pass. Agent. **J. C. McMULLIN, Gen. Supt.**

North Missouri R. R.

PASSENGERS FOR

KANSAS AND THE WEST,

ARE REMINDED THAT

THE NORTH MISSOURI R. R.

— IS —

11 MILES SHORTER than any other Route!

BETWEEN

St. Louis and Kansas City.

15 Miles Shorter between ST. LOUIS and LEAVENWORTH

— AND —

49 MILES SHORTER TO ST. JOSEPH!

THAN ANY OTHER LINE OUT OF ST. LOUIS.

☞ Three Through Express Trains Daily! ☜

Pullman's Celebrated Palace Sleeping Cars on all Night Trains!

☞ **FOR TICKETS,** apply at all Railroad Ticket Offices, and see that you get your Tickets via St. Louis and North Missouri Railroad.

C. N. PRATT, Gen. Eastern Agt., 111 Dearborn-st. CHICAGO.
S. H. KNIGHT, Gen. Superintendent, ST. LOUIS.

JAS. CHARLTON, Gen. Pass. and Ticket Agt., St. Louis.

Pacific Railroad of Missouri.

THE MOST DIRECT AND RELIABLE ROUTE FROM ST. LOUIS THROUGH TO

KANSAS CITY, LEAVENWORTH & ATCHISON,

☞ WITHOUT CHANGE OF CARS! ☜

Close Connections at KANSAS CITY with Missouri Valley, Missouri River, Ft. Scott & Gulf, and Kansas Pacific R'ys, for Weston, St. Joseph, Junction City, Fort Scott, Lawrence, Topeka, Sheridan, Denver, Fort Union, Santa Fe, and

ALL POINTS WEST!

☞ At SEDALIA, WARRENSBURG and PLEASANT HILL, with Stage Lines for Warsaw, Quincy, Bolivar, Springfield, Clinton, Osceola, Lamar, Carthage, Granby, Neosho, Baxter Springs, Fort Gibson, Fort Smith, Van Buren, Fayetteville, Bentonville.

PALACE SLEEPING CARS on all NIGHT TRAINS.

Baggage Checked Through Free!

THROUGH TICKETS for sale at all the Principal Railroad Offices in the United States and Canadas. **Be Sure and Get your Tickets over the PACIFIC R. R. OF MISSOURI.**

W. B. HALE, Gen. Pass. and Ticket Agt.
THOS. McKISSOCK, General Superintendent

61 Miles the Shortest Line!

— FROM —

CHICAGO TO NEW YORK.

Pitts., Ft. Wayne & Chicago

— AND —

PENNSYLVANIA CENTRAL

IS THE ONLY ROUTE

Running its Entire Trains **THROUGH** to Philadelphia and New York, and the only Route running Three Daily Lines of Pullman Day and Sleeping Palaces, from Chicago to

PITTSBURGH, HARRISBURG,

PHILADELPHIA & NEW YORK,

☞ WITHOUT CHANGE! ☜

WITH BUT ONE CHANGE TO

BALTIMORE, PROVIDENCE, NEW HAVEN, HARTFORD, SPRINGFIELD, WORCESTER & BOSTON!

AND THE MOST DIRECT ROUTE TO WASHINGTON.

☞ Trains Leave WEST SIDE UNION DEPOT, corner West Madison and Canal Streets, as follows:

LEAVE:	Mail.	Fast Express.	Pacific Exp.	Night Exp.
CHICAGO	6.00 A. M.	11.00 A. M.	5.25 P. M.	9.00 P. M.
PLYMOUTH	10.08 "	2.03 P. M.	9.10 "	12.35 A. M.
FORT WAYNE	1.10 P. M.	3.45 "	11.35 "	3.20 "
LIMA	3.42 "	5.15 "	1.35 A. M.	5.35 "
FOREST	5.10 "	6.07 "	2.45 "	6.57 "
CRESTLINE	6.15 A. M.	7.40 "	4.30 "	9.35 "
MANSFIELD	6.58 "	8.05 "	5.00 "	10.05 "
ORRVILLE	9.20 "	9.42 "	6.57 "	11.55 "
ALLIANCE	11.30 "	11.05 "	8.50 "	1.30 P. M.
PITTSBURGH	8.10 P. M.	3.30 A. M.	1.00 P. M.	5.22 "
CRESSON	11.57 "	5.44 "	4.48 "	9.08 "
ALTOONA	12.48 A. M.	6.35 "	5.55 "	10.00 "
HARRISBURG	5.30 "	10.40 "	10.45 "	2.50 A. M.
MANTUA JUNCTION	9.30 "	2.00 P. M.	2.50 "	6.45 "
PHILADELPHIA	9.40 "	2.10 "	3.00 "	6.50 "
NEW YORK, VIA PHILADELPHIA	11.40 "	5.06 "	6.41 "	10.30 "
NEW YORK, VIA ALLENTOWN	1.00 P. M.	5.06 "		
BALTIMORE	9.30 A. M.	2.00 "	2.30 A. M.	
WASHINGTON	1.10 P. M.	5.00 "	5.45 "	
BOSTON	11.50 "	5.50 A. M.	5.05 "	9.00 P. M.

Boston and New England Passengers will find this Route especially Desirable, as it gives them an opportunity of Seeing the FINEST VIEWS AMONG THE ALLEGHANY MOUNTAINS,

Besides Visiting PITTSBURGH, PHILADELPHIA and NEW YORK, without extra cost!

☞ All New England Passengers holding Through Tickets will be Transferred, with their Baggage, to Rail and Boat Connections in NEW YORK, **Without Charge!**

THROUGH TICKETS for sale at the Company's Offices, at 65 Clark St.; 52 Clark St.; cor. Randolph and LaSalle Sts.; and at Depot, Chicago. Also at Principal Ticket Offices in the West.

CLOSE CONNECTIONS Made at LIMA for all Points on the Dayton & Michigan and the Cincinnati, Hamilton & Dayton Railways, and at CRESTLINE for Cleveland and Columbus.

Express Trains are Equipped with WESTINGHOUSE AIR BRAKES,

The Most Perfect Protection Against Accidents in the World!

F. R. MYERS, Gen. Pass. & Tkt Agt. P. F.W. & C. R'y Chicago. | **W. C. CLELAND,** Gen. Western Pass. Agt. P. F. W. & C. R'y, Chicago.

T. L. KIMBALL, Gen. Western Pass. Agt. Penn. Cen. R. R. Chicago.

Broad Gauge! Double Track!

ERIE RAILWAY.

4 EXPRESS TRAINS DAILY!

From Cleveland, Dunkirk and Buffalo, 625 Miles, to New York, WITHOUT CHANGE of Coaches!

☞ The Trains of this Railway are run in DIRECT CONNECTION WITH ALL WESTERN AND SOUTHERN LINES, for

Elmira, Williamsport, Oswego, Great Bend, Scranton, Newburgh,

NEW YORK, ALBANY, BOSTON, PROVIDENCE,

AND PRINCIPAL NEW ENGLAND CITIES.

New and Improved DRAWING ROOM COACHES are attached to the DAY EXPRESS Running THROUGH TO NEW YORK.

☞ **SLEEPING COACHES, Combining all Modern Improvements,** with perfect Ventilation and the peculiar arrangements for the comfort of Passengers incident to the **BROAD GAUGE,** accompany all night trains to New York.

CONNECTIONS CERTAIN! as Trains on this Railway will, when necessary, **wait from one to two hours for Western trains.**

All Trains of Saturday run directly Through to New York.

☞ **Ask for Tickets via Erie Railway,** which can be procured at **66 Clark Street** Chicago, and at all Principal Ticket offices in the West and Southwest.

L. D. RUCKER, Gen'l Superintendent, New York. | **A. J. DAY,** Western Passenger Agent, Chicago. | **WM. R. BARR,** Gen'l Passenger Agent, New York.

Pan-Handle

— AND —

Penn'a Central Route East!

☞ SHORTEST AND QUICKEST ROUTE, VIA COLUMBUS, TO ☜

PITTSBURGH, BALTIMORE, PHILADELPHIA & NEW YORK

On and after Sunday, NOVEMBER 27th, 1870, Trains for the East will run as follows:

[DEPOT CORNER CANAL AND KINZIE STS., WEST SIDE.]

7:40 A. M. DAY EXPRESS.

[SUNDAYS EXCEPTED.] Via Richmond. Arriving at

COLUMBUS	3:00 A. M.	HARRISBURG	10:35 P. M.	NEW YORK	6:40 A. M.	WASHINGTON	5:45 A. M.
PITTSBURGH	12:15 M.	PHILADELPHIA	3:10 A. M.	BALTIMORE	2:30 A. M.	BOSTON	5:05 P. M.

7:10 P. M. NIGHT EXPRESS.

[SUNDAYS EXCEPTED.] Arriving at:

COLUMBUS	11:15 A. M.	HARRISBURG	5:20 A. M.	NEW YORK	11:40 A. M.	WASHINGTON	1:10 P. M
PITTSBURGH	7:25 P. M.	PHILADELPHIA	9.50 A. M.	BALTIMORE	9:30 A. M.	BOSTON	11:50 P. M

Palace Day and Sleeping Cars

Run Through to COLUMBUS, and from Columbus to NEW YORK, WITHOUT CHANGE!

ONLY ONE CHANGE TO NEW YORK, PHILADELPHIA, OR BALTIMORE!

CINCINNATI & LOUISVILLE AIR LINE SOUTH.

35 Miles the Shortest Route to Cincinnati,
18 Miles the Shortest Route to Indianapolis and Louisville.

3 Hours the Quickest Route to Cincinnati!

THE SHORTEST AND BEST ROUTE TO

Columbus, Chillicothe, Hamilton, Wheeling, Parkersburg, Evansville, Dayton, Zanesville, Marietta, Lexington, Terre Haute, Nashville,

ALL POINTS IN CENTRAL & SOUTHERN OHIO, & INDIANA, KENTUCKY & VIRGINIA.

— QUICK, DIRECT AND ONLY ALL RAIL ROUTE TO —

New Orleans, Memphis, Mobile, Vicksburg, Charleston, Savannah,

AND ALL POINTS SOUTH.

Cincinnati, Indianapolis and Louisville Trains run as follows:

THROUGH WITHOUT CHANGE OF CARS!

7.40 A. M. (Sundays excepted) Arriving at

LOGANSPORT	1:15 P. M.
KOKOMO	3:33 P. M.
CINCINNATI	10:10 P. M.
INDIANAPOLIS	5:00 P. M.
LOUISVILLE	11:30 P. M.

8.05 P. M. (Saturdays excepted.) Arriving at

LOGANSPORT	1:15 A. M.
KOKOMO	3:31 A. M.
CINCINNATI	9:35 A. M.
INDIANAPOLIS	5:40 A. M.
LOUISVILLE	3:50 P. M.

Lansing Accommodation: Leaves 3:40 P. M. Arrives 10:55 A. M.

PULLMAN'S PALACE SLEEPING CARS!

Accompany all Night Trains between Chicago and Cincinnati or Indianapolis.

☞ Ask for Tickets **via COLUMBUS** for the East, and **via "The AIR LINE"** for Cincinnati, Indianapolis, Louisville and points South. Tickets for sale and Sleeping Car Berths secured at **95 RANDOLPH STREET, CHICAGO,** and at Principal Ticket Offices in the West and Northwest.

WM. L. O'BRIEN, Gen. Pass. and Ticket Agent, Columbus. **I. S. HODSDON** Northwestern Pass. Agt. Chicago.

D. W. CALDWELL Gen Supt. Columbus.

The Great Favorite Route for Missouri, Nebraska and Iowa.

KANSAS CITY, ST. JOSEPH

— AND —

COUNCIL BLUFFS

☞ THROUGH LINE! ☜

3 EXPRESS PASSENGER TRAINS Leave Union Depot Daily, on the arrival of Eastern Southern and Western Trains, crossing the Missouri River on the New Iron Bridge at KANSAS CITY, passing the cities of

LEAVENWORTH, ATCHISON, SAINT JOSEPH,

— AND —

NEBRASKA CITY.

Connecting at COUNCIL BLUFFS with Iowa Lines for all prominent points in Iowa, and making DIRECT CONNECTION at **OMAHA** with the Great **Union Pacific Railroad,** for

CHEYENNE, DENVER, SALT LAKE, SACRAMENTO, SAN FRANCISCO

And the Pacific Coast.

Pullman's Palace Sleeping Cars!

ON ALL NIGHT TRAINS.

☞ Ask for Tickets via the People's Favorite Route, **Kansas City, St. Joseph & Council Bluffs Railroad Line.**

A. L. HOPKINS, Gen. Superintendent ST. JOSEPH, Mo. **A. C. DAWES,** Gen. Passenger Agent, ST. JOSEPH, Mo.

LAKE SHORE
— AND —
MICHIGAN SOUTHERN R.W.

THE GREAT THROUGH LINE BETWEEN

CHICAGO, BUFFALO & NEW YORK,

WITHOUT CHANGE!

AND THE ONLY RAILWAY

RUNNING PALACE COACHES THROUGH!

— BETWEEN —

CHICAGO & NEW YORK, via BUFFALO

☞ WITHOUT TRANSFER OF PASSENGERS! ☜

All Trains Stop at Twenty-Second Street to Take and Leave Passengers. Baggage Checked at that Station for all Points East.

4 EXPRESS TRAINS DAILY, [Sundays Excepted,] Leave Chicago from the New Depot, on Van Buren St., at the head of La Salle Street, as follo w

7:30 A. M. MAIL TRAIN. VIA OLD ROAD AND AIR LINE. SUNDAYS EXCEPTED.

Leaves 22d Street 7:45 A. M. Stops at all Stations. **Arrives**—Toledo, 6:20 P. M.

11:30 A. M. SPECIAL NEW YORK EXPRESS, VIA AIR LINE. SUNDAYS EXCEPTED.

Leaves—Twenty-Second Street, **11:45 A. M. Arrives**—Elkhart, 2:55 P. M.; Cleveland 10:40 P. M.; Buffalo, 4:10 A. M.; New York, 5:30 P. M.; (Chicago Time) Boston, 11:45 P. M.

This Train has PALACE SLEEPING COACH Attached, Running

THROUGH TO ROCHESTER, WITHOUT CHANGE!

IN DIRECT CONNECTION WITH

Wagner's Celebrated Drawing-Room Coaches on N. Y. Central R. R.

Only Thirty Hours, Chicago to New York!

5:15 P. M. ATLANTIC EXPRESS (Daily), VIA OLD ROAD.

Leaves—Twenty-Second Street **5:30 P. M. Arrives**—Laporte, 8:10 P. M. (Stops 20 minutes or Supper); arrives at Toledo, 2:50 A. M.; Cleveland, 7:25 A. M. (20 minutes for Breakfast); arrives at Buffalo, 1:50 P. M.; Rochester, 5:10 P. M. (30 minutes for Supper); connects with **Sleeping Coach running Through from Rochester to Boston Without Change,** making but **One Change between Chicago and Boston.**

NEW AND ELEGANT SLEEPING COACH Attached to this Train, Running THROUGH from CHICAGO TO NEW YORK WITHOUT CHANGE! Arrives at NEW YORK, 6:40 A. M.

9:00 P. M. NIGHT EXPRESS VIA AIR LINE. (DAILY EXCEPT SAT. & SUN.)

Leaves—Twenty-Second Street, **9:15 P. M. Arrives**—Toledo, 6:00 A. M. (20 minutes for Breakfast); arrives at Cleveland, 10:35 A. M.; Buffalo, 5:30 P. M.; New York, 11:00 A. M.; Boston, 3:50 P. M.

KALAMAZOO DIVISION.

Leave Chicago 11:30 A. M. Arrive at Kalamazoo 5:30 P. M.; Grand Rapids, 8:15 P. M.

Leave Chicago 9:00 P. M. Arrive at Kalamazoo 7:10 A. M.; Grand Rapids, 10:20 A. M.

Elkhart Accommodation leaves Chicago, 3:30 P. M. Arrives at Elkhart, 8:20 P. M.

☞ There being no heavy grades to overcome, or mountains to cross, the road bed and track being the smoothest and most perfect of any railway in the United States, this Company run their trains at a high rate of speed with perfect safety.

☞ Travelers who wish to SAVE TIME and make SURE CONNECTIONS, purchase Tickets via

LAKE SHORE & MICHIGAN SOUTHERN R'Y.

THE ONLY LINE RUNNING THROUGH BETWEEN CHICAGO AND BUFFALO, WITHOUT TRANSFER, and in Direct Connection with NEW YORK CENTRAL RAILROAD and ERIE RAILWAY.

General Ticket Office for Chicago, No. 56 Clark Street.

CHAS. F. HATCH,
General Superintendent, Cleveland, Ohio

F. E. MORSE,
General Western Passenger Agent, Chicago.

ILLINOIS CENTRAL RAILROAD.

PASSENGER TRAINS LEAVE CHICAGO FROM THE GREAT CENTRAL DEPOT, FOOT OF LAKE ST.

ST. LOUIS AND CHICAGO
THROUGH LINE.

9:30 A. M. DAY EXPRESS Sundays Ex. Arriving in ST. LOUIS at 10:15 P. M.

☞ This Train Reaches St. Louis ONE HOUR & FIFTEEN MINUTES in Advance of any other Route! ☜

8:30 P. M. FAST LINE. Saturdays Excepted. Arriving at ST. LOUIS at 8:00 A. M.

AT ST. LOUIS, Direct Connections are Made FOR

Jefferson City, Sedalia, Pleasant Hill, Macon, Kansas City,

LEAVENWORTH, ST. JOSEPH & ATCHISON,

—Connecting at KANSAS CITY for—

LAWRENCE, TOPEKA, JUNCTION CITY, SALINA, SHERIDAN, &c.

CAIRO, MEMPHIS AND NEW ORLEANS LINE.

9:30 A. M. CAIRO MAIL, Sundays Excepted. Arriving at **Cairo** 2:30 A. M., **Memphis** 12:40 P. M., **Mobile** 9:40 A. M **Vicksburg** 9:30 A. M., **New Orleans** 11:10 A. M.

8:30 P. M. CAIRO EXPRESS, Except Saturdays. Arriving at **Cairo** 3:15 P. M., **Memphis** 2:30 A. M., **Vicksburg** 5:00 P. M., **New Orleans** 1:30 A. M.

4:55 P. M. CHAMPAIGN PASSENGER, Arriving at **Champaign** at 11:15 P. M.

☞ THIS IS THE ONLY DIRECT ROUTE TO

Humboldt, Corinth, Grand Junction, Little Rock, Selma, Canton, Grenada, Columbus, Meridian, Enterprise,

MEMPHIS, VICKSBURG, NEW ORLEANS & MOBILE.

At NEW ORLEANS, connections are made for

GALVESTON, INDIANOLA,

And all Parts of Texas.

☞ NOTICE.—This Route is from 100 to 150 MILES SHORTER, and from 12 to 24 HOURS QUICKER than any other.

THIS IS ALSO THE ONLY DIRECT ROUTE TO

DECATUR, TERRE HAUTE, VINCENNES & EVANSVILLE.

Peoria and Keokuk Line.

9:30 A. M. KEOKUK PASSENGER, Sun. Excepted. Arriving at **Chenoa** 3:15 P. M., **El Paso** 4:05 P. M., **Peoria** 5:40 P. M., **Canton** 7:14 P. M., **Bushnell** 8:59 P. M., **Keokuk** 11:26 P. M., **Warsaw** 12:05 A. M.

Elegant Drawing Room Sleeping Cars

ATTACHED TO ALL NIGHT TRAINS.

Spacious and Fine Saloon Cars!

WITH ALL MODERN IMPROVEMENTS, RUN UPON ALL TRAINS.

BAGGAGE CHECKED THROUGH TO ALL IMPORTANT POINTS.

☞ For Through Tickets, Sleeping Car Berths, Baggage Checks, and information, apply at the office of the Company in the Great Central Depot, foot of Lake St.

Hyde Park and Oakwoods Train.

	Leave.	Arrive.		Leave.	Arrive.
HYDE PARK TRAIN,...	*6:20 A. M.	*7.45 A. M.	HYDE PARK TRAIN,....	*2:00 P. M.	*5:15 P. M
HYDE PARK TRAIN...	*8:00 A. M.	*9.15 A. M.	HYDE PARK TRAIN,....	*6:10 P. M.	*7:35 P. M
HYDE PARK TRAIN,..	*12:10 P. M.	*1:50 P. M.			

* Sundays Excepted.

W. P. JOHNSON, Gen. Pass. Agent. **M. HUGHITT, Gen. Supt.**

1870. Great Central Route! 1870.

SPEED! COMFORT! SAFETY!

MICHIGAN CENTRAL and GREAT WESTERN RAILWAYS!

The Great Central Route, via Niagara Falls, to

NEW YORK AND NEW ENGLAND.

Pullman's Magnificent Palace Drawing-Room Cars,

— FROM —

CHICAGO TO NEW YORK CITY, WITHOUT CHANGE.

4 PASSENGER TRAINS LEAVE CHICAGO, DAILY EXCEPT SUNDAY.
(DEPOT, FOOT OF LAKE STREET,) as Follows:

5:00 A. M. (SUNDAYS EXCEPTED.) MAIL TRAIN. Stops at all Stations.
Arrives DETROIT at 5:40 P. M.

11:30 A. M. (SUNDAYS EXCEPTED.) SPECIAL NEW YORK & BOSTON EXP.
Arrives at Michigan City 1:13 P M; New Buffalo 1:32, Niles 2:15, [Dinner], Kalamazoo 3:32 P. M.; Battle Creek 4:28, Marshall 4:48, Jackson 5:45, Detroit 7:55, London 12:05, A. M Hamilton 2:35 A. M; Toronto 9 20, Suspension Bridge 3:55, Rochester 7:00 A. M; Albany, 2:00 P. M.; NEW YORK, **6:25**, BOSTON, **11:50 P. M.** ☞ This train connects at ROCHESTER (7:00 A. M.) with

Wagner's Magnificent Palace Drawing-Room Cars!

☞ RUNNING THROUGH TO NEW YORK, WITHOUT CHANGE! ☜

5:15 P. M. (DAILY.) ATLANTIC EXPRESS.
Arrives at Michigan City, 7:18 P. M.; Niles 8:40 P. M. [Supper]; Kalamazoo, 10:25 P. M.; Jackson, 1:00 A. M.; Detroit 3:40, London, 8:35, [Breakfast]; Hamilton 11:40, Suspension Bridge 1:30 P. M.; Rochester 5:00 P. M.; Albany, 1:30 A. M.; NEW YORK, **6:40 A. M.**; BOSTON, **11:00 A. M.**
A MAGNIFICENT DRAWING-ROOM SLEEPING CAR is attached to this train daily, FROM CHICAGO TO NEW YORK CITY. The celebrated

☞ **Hotel Drawing-Room Car is also attached to this Train from Chicago to Rochester!** ☜

☞ These, together with **ELEGANT DAY CARS TO SUSPENSION BRIDGE,** make this Train the favorite Train for all points East.

SPECIAL NOTICE.—Boston and New England Passengers will please notice that this Train now makes direct connection through. A SLEEPING CAR is attached at Rochester at 5.20 P. M., running through to Springfield, Mass., thus avoiding transfer at Albany. Breakfast at Springfield. This Train reaches Springfield early enough second morning to **Connect with all Trains** up and down the Connecticut.

9:00 P. M. (SAT. & SUN. EXCEPTED). NIGHT EXPRESS.
Arrives at Michigan City, 11:03 P. M.; Niles, 12:25 A. M; Kalamazoo, 2:00; Marshall, 3:12; Jackson, 4:25; Grand Trunk Junction, 7:00; Detroit, 7:30; London, 1:45 P. M; Hamilton, 4:35; Toronto, 9:35; Niagara Falls, 6:15; Buffalo, 7:15 P. M.; Rochester, 9:10; Syracuse, 12:25 A. M.; Rome, 1:55; Utica, 2:25; Albany, 6:30 A. M.; NEW YORK, **10:00 A. M.**; BOSTON, **3:40 P. M.**

PULLMAN'S PALACE SLEEPING CARS ARE ATTACHED TO THIS TRAIN FROM CHICAGO TO DETROIT,
And from Suspension Bridge to New York.

WE INVITE THE ATTENTION OF THE TRAVELER to the SPLENDID EQUIPMENTS of this FIRST-CLASS LINE TO THE EAST!

☞ FOR THROUGH TICKETS, and any and all information, Sleeping Car accommodations, &c., apply at General Office in Tremont House Block, at office in Great Central Depot; also at No. 60 Clark street, under Sherman House; at Grand Trunk Railway Office, 48 Clark street, or at New York Central Railroad Office, No. 53 Clark street, and at office under Briggs House.

H. E. SARGENT, Gen. Supt. M. C. R. R. W. K. MUIR, Gen. Supt. Gt. Western R. W. HENRY C. WENTWORTH, Gen. Pass. Agt.

CHICAGO, INDIANAPOLIS & LOUISVILLE

THROUGH LINE!

—VIA—

MICHIGAN CENTRAL RAILROAD.

THE ONLY ROUTE TO

TO LOUISVILLE, WITHOUT CHANGE OF CARS.

TWO EXPRESS TRAINS Leave Chicago Depot, Foot of Lake as Follows:

9:00 A. M. (EXCEPT SUNDAY.) MORNING EXPRESS
Arriving at LaFayette, 2:25 P. M.; Indianapolis, 6:00 P. M; Louisville, 11:30 P. M.

4:30 P. M. (EXCEPT SATURDAY) AFTERNOON EXPRESS
Arriving at Michigan City 6:20 P. M. [Supper]; LaFayette, 11:30 P. M. Indianapolis, 2:15 A. M.; Louisville, 7:00 A. M.; Nashville, 4 00 P. M.

A GOOD SLEEPING CAR is Attached to this Train Every Night,
And goes from Chicago to Louisville WITHOUT CHANGE!

☞ **SPECIAL NOTICE.**—This Train stops at Michigan City for Supper, and waits at that point for Michigan Central Atlantic Express East, leaving Chicago at 4:45 p. m. Passengers going South, and wishing as much time in Chicago as possible, can take the 4:45 p. m. Michigan Central Atlantic Express, and connect without fail at Michigan City, with above Through Louisville Express.

☞ **THE GREAT BRIDGE ACROSS THE OHIO** at Louisville being completed, passengers are relieved of the omnibus transfer.

FOR THROUGH TICKETS, via this line, apply at offices of connecting lines and at all Ticket offices in Chicago.

HENRY C. WENTWORTH, Gen. Pass. Agent.

Michigan Central R. R.

LOCAL CONNECTIONS:

Chicago & Michigan Lake Shore Railroad.

Open from New Buffalo to St. Joseph, Mich.

5:00 A. M. AND **4:30** P. M. Trains from Chicago Connect at New Buffalo.

Kalamazoo, Allegan & Grand Rapids R. R.

Open to Grand Rapids.

11:30 A. M. AND **9:00** P. M. Trains from Chicago Connect at Kalamazoo

Peninsular Railroad of Michigan.

Open to Charlotte.

5:00 A. M. AND **9:00** P. M. Trains from Chicago Connect at Battle Creek.

Jackson, Lansing & Saginaw Railroad.

Open to Bay City, Mich. Passing through Lansing and Saginaw.

5:00 A. M. AND **9:00** P. M. Trains from Chicago Connect at Jackson.

GRAND TRUNK RAILWAY.

All Michigan Central Trains Connect at Grand Trunk Junction

— FOR —

SARNIA, TORONTO, MONTREAL,

PORTLAND, BOSTON, BUFFALO, OGDENSBURG

AND ALL POINTS EAST.

H. E. SARGENT, General Superintendent.

JACOB R. SHIPHERD & CO.,

155 and 157 LaSalle Street,

CHICAGO.

RAILWAY BANKERS

NEGOTIATE

MORTGAGE BONDS,

And Local Bonds issued in Aid;

Make Advances; Complete Unfinished Roads, etc., etc.

Rand, McNally & Co.,

[TRIBUNE JOB OFFICE]

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ENGRAVERS,

—AND—

Blank Book Manufacturers

IN THE WEST.

Railroad Printing and Stationery a Specialty.

Consecutively Numbered Railroad Tickets,

Ticket Cases, Conductors' Punches,

DATING PRESSES, CANCELING STAMPS,

ETC., ETC., ETC.

49, 51 and 53 Clark Street,

CHICAGO.

Established 1852.

CLEVELAND FILE WORKS

CLEVELAND, OHIO.

All descriptions of Files Manufactured and Recut. Also, dealers in *Best English Cast Tool Steel*. Orders solicited and satisfaction guaranteed. JOHN PARKIN, Prop'r.

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Should Address Orders for

THE RAILROAD GAZETTE,

— TO —

The Western News Company,

CHICAGO.

IMPORTANT DISCOVERY!

"A COPYING PRINTERS' INK,"

[McILVAINE'S PATENT.]

Peculiarly adapted for

Manifests, Bills of Lading, Bank Circulars, Reports and Statements of Accounts Current, Letter Heads, &c.

Yielding as PERFECT AN IMPRESSION as that of the BEST COPYING INK for writing purposes—the use of the two in connection filling a want never heretofore supplied.

HELFENSTEIN & LEWIS,

Railroad and Commercial Printing Rooms.

Corner of Fifth and Chestnut Streets,

PHILADELPHIA.

☞ Specimen impressions furnished on application.

BENOIT & WOOD,

Manufacturers and Importers of

Artists' Materials!

Drawing Paper, Mathematical Instruments, Architects' and Engineers' Supplies, Patented T Squares, Triangles and Straight Edges.

148 FULTON STREET, NEW YORK.

HARRISBURG

CAR MANUFACTURING CO.,

Harrisburg, Pennsylvania,

MANUFACTURE

Passenger, Mail, Baggage, Box Gondola, Coal,

AND ALL OTHER KINDS OF

RAILROAD CARS!

Railroad Car Wheels & Castings,

Bridge & Rolling Mill Castings,

Bridge Rods, Bolts,

—AND—

RAILROAD FORGINGS!

W. T. HILDRUP, *Superintendent.*

WILLIAM COLDER, *President.*

HARRISBURG

Foundry and Machine Works!

(Branch of Harrisburg Car Mfg Co.,)

Harrisburg, - - Pennsylvania.

MANUFACTURERS OF

MACHINISTS' TOOLS!

— SUCH AS —

LATHES, PLANERS,

Shaping and Slotting Machines, Bolt Cutting & Nut Tapping Machines, &c.

W. T. HILDRUP, *Treasurer.*

PHŒNIXVILLE BRIDGE WORKS.

Clarke, Reeves & Co.,

Successors to Kellogg, Clarke & Co.,

Engineers & Iron Bridge Builders,

OF PHŒNIXVILLE, PA.,

Will henceforth have their Principal Business Office at 410 Walnut St., Philadelphia, to which all correspondence should be addressed. Circulars, plans and prices sent on application.

IRON BRIDGES, PIVOT BRIDGES

—AND—

Turn Tables.

F. C. LOWTHORP,

Civil Engineer, Patentee & Builder,

78 E. STATE STREET,

TRENTON, N. J.

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